BEFORE

THE PUBLIC SERVICE COMMISSION OF

SOUTH CAROLINA

DOCKET NOS. 2017-207-E, 2017-305-E, AND 2017-370-E

IN RE:	Friends of the Earth and Sierra Club, Complainant/Petitioner vs. South Carolina Electric & Gas Company, Defendant/Respondent	)))))
IN RE:	Request of the South Carolina Office of Regulatory Staff for Rate Relief to SCE&G Rates Pursuant to S.C. Code Ann. § 58-27-920	)))))
IN RE:	Joint Application and Petition of South Carolina Electric & Gas Company and Dominion Energy, Incorporated for Review and Approval of a Proposed Business Combination between SCANA Corporation and Dominion Energy, Incorporated, as May Be Required, and for a Prudency Determination Regarding the Abandonment of the V.C. Summer Units 2 & 3 Project and Associated Customer Benefits and Cost Recovery Plans	))))))))))

AFFIDAVIT OF SHERI L. WICKER

1. Personally appeared before me Sheri L. Wicker who, having first been duly sworn, deposes and states as follows: My name is Sheri L. Wicker. I am currently Manager of South Carolina Electric & Gas Company's ("SCE&G") Credit Department. Prior to assuming this role, I served as Manager, Finance Administration at SCANA Corporation ("SCANA"). I held the position of Manager, Finance Administration during the time period April 30, 2011 – October 31, 2017. I have worked for SCANA for over thirty years.

2. I have personal knowledge of the facts stated herein.

3. My responsibilities as Manager, Finance Administration included, among other things, maintaining the work order and underlying invoices for the construction of **V.C. Summer Nuclear Station Units 2 and 3** ("the Project").

4. While I worked as Manager, Finance Administration at SCANA, the South Carolina Office of Regulatory Staff ("ORS"), as part of its auditing function, requested from SCE&G work order and invoices for the Project. ORS generally made these requests on a monthly basis.

5. As part of its auditing function, ORS requested from SCE&G invoices of the law firm Smith, Currie & Hancock LLP related to the Project. ORS made these requests in 2012, 2013, 2014, 2015, and 2017. Examples of these invoices are attached as Exhibit A.

6. In 2015, ORS requested Smith, Currie & Hancock's July 2015 and August 2015 invoices to SCANA/SCE&G. These invoices reference Smith, Currie & Hancock's work related to Bechtel Corporation, including its engagement of Bechtel Corporation for an assessment of the Project. A copy of these invoices is attached as Exhibit B.

FURTHER AFFIANT SAYETH NOT

Sheri L. Wicker

Sworn to and subscribed before me
this 11th day of June, 2018

Notary Public for South Carolina
My Commission Expires: 01/20/2026

KAREN MEEK SCRUGGS NOTARY PUBLIC SOUTH CAROLINA

STATEMENT
SMITH, CURRIE & HANCOCK LLP
ATTORNEYS AT LAW
A LIMITED LIABILITY PARTNERSHIP
2700 MARQUIS ONE TOWER
245 PEACHTREE CENTER AVENUE, N.E.
ATLANTA, GA 30303-1227
TELEPHONE (404) 521-3800

ALVIS J. BYNUM, JR., ASST. GENERAL COUNSEL
SCANA, SOUTH CAROLINA ELECTRIC & GAS
220 OPERATION WAY
CAYCE, SC 29033-3701

June 1, 2012
Client: SCA110
Matter: SCA11A
Invoice # 308482
Bill Atty: GDW

FOR PROFESSIONAL SERVICES RENDERED THROUGH June 01, 2012

RE: V.C. SUMMER NUCLEAR PLANT

12/05/2011	GDW	Telephone conference with Ron Lindsay, Alvis Bynum, and Bob Chambers; begin review of claim submissions and NRC documents.	4.50hr	$2,160.00
12/05/2011	RCC	SCANA: Begin review of information received from Al Bynum.	1.00hr	$375.00
12/06/2011	RCC	SCANA: Continued preliminary review of position papers and e-mail exchanges with Al Bynum.	0.90hr	$337.50
12/06/2011	GDW	Continue review of Claim Summaries and NRC documents.	3.50hr	$1,680.00
12/07/2011	RCC	SCANA: Continued review of position papers.	0.80hr	$300.00
12/08/2011	RCC	SCANA: Continued review of position papers and begin preliminary chronology outline.	1.00hr	$375.00
12/09/2011	GDW	Continue review of Claims Summaries and NRC documents; review various documents from NRC's website.	7.80hr	$3,744.00
12/11/2011	RCC	SCANA: Additional review of information, including contract documents in preparation for meeting with Scana counsel tomorrow.	1.00hr	$375.00
12/12/2011	RCC	SCANA: Final review of position papers and additional review of contract documents in preparation for meeting with Ron Lindsay and Al Bynum; work with George Wenick prior to meetings; meet with Scana counsel and George Wenick; follow ups to meeting.	5.40hr	$2,025.00
12/12/2011	GDW	Draft proposed contract interpretation for use at meeting; conference with Ron Lindsay, Al Bynum, and Bob Chambers.	4.80hr	$2,304.00
12/15/2011	GDW	Review EPC Contract and August 10, 2010, Agreement; prepare draft Amendment No. 1.	7.80hr	$3,744.00
01/23/2012	GDW	Respond to inquiry concerning FTZs.	0.50hr	$240.00
02/06/2012	GDW	Begin work on memorandum concerning FTZs.	4.50hr	$2,160.00
02/07/2012	GDW	Continue work on FTZ memorandum.	6.50hr	$3,120.00

Matter: SCA11A

55/95

Invoice: 308482
Page 2 of 2

02/08/2012	GDW	Finalize and send memorandum concerning FTZs.	6.40hr	$3,072.00
05/02/2012	GDW	Review draft settlement agreement and draft proposed revisions to the release language.	2.00hr	$960.00
		TOTAL FEES		**$26,971.50**

Lawyer	Total Hours	Billed Hours	Rate	Amount
GEORGE D WENICK	48.30	48.30	480.00	23,184.00
ROBERT C CHAMBERS	10.10	10.10	375.00	3,787.50
	58.40	**58.40**		**26,971.50**

INVOICE SUMMARY		
	Total of Fees (Time Charges)	$26,971.50
	Total of Costs (Expense Charges)	$0.00
	Total New Charges	**$26,971.50**
	TOTAL BALANCE DUE	**$26,971.50**

Any outside expenses and in-house standard charges not currently posted to the ledger will be included in our next statement.

All invoices are due and payable within 30 days of invoice date.

Federal Tax ID No. 58-0954951

STATEMENT

SMITH, CURRIE & HANCOCK LLP

ATTORNEYS AT LAW
A LIMITED LIABILITY PARTNERSHIP
2700 MARQUIS ONE TOWER
245 PEACHTREE CENTER AVENUE, N.E.
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TELEPHONE (404) 521-3800

SCANA CORP
RECEIVED
AUG 10 2015
LEGAL DEPARTMENT

Cheryl

ACCOUNTS PAYABLE
SCANA, SOUTH CAROLINA ELECTRIC & GAS
220 OPERATION WAY
MAIL CODE - C232
CAYCE, SC 29033-3701

July 31, 2015
Client: SCA110
Matter: SCA11A
Invoice# 324446
Bill Atty: GDW

FOR PROFESSIONAL SERVICES RENDERED THROUGH July 31, 2015

RE: V.C. SUMMER NUCLEAR PLANT

07/08/2015	GDW	Review Bechtel proposal; draft professional services agreement; review change order language on price and schedule and suggest changes.	4.20hr	$2,289.00
07/10/2015	GDW	Telephone conference with Al Bynum, Steve Pelcher, and Skip Smith; draft proposed revisions to sections 3 and 9 of draft Change Order; finalize draft Professional Services Agreement and send to Al Bynum and Steve Pelcher.	4.20hr	$2,289.00
07/14/2015	GDW	Prepare proposed revisions to draft Change Order.	0.80hr	$436.00
07/22/2015	GDW	Review draft Change Order 22 and prepare notes for conference call.	1.30hr	$708.50
07/23/2015	GDW	Review materials for call with the contractor; participate in call; prepare redlined version of revised draft; make additional changes to draft to address payment and stop work issues.	3.50hr	$1,907.50
07/28/2015	GDW	Telephone conference with Al Bynum and Steve Pelcher; review and revise draft agreemant with contractor concerning Bechtel assessment.	2.30hr	$1,253.50
07/29/2015	GDW	Review contractor's most recent draft of CO 22; review and propose edits to contractor's most recent draft of agreement concerning Bechtel's assessment.	2.00hr	$1,090.00
07/30/2015	GDW	Make additional revisions to draft Assessment Agreement.	1.50hr	$817.50

TOTAL FEES $10,791.00

Lawyer	Total Hours	Billed Hours	Rate	Amount
GEORGE D WENICK	19.80	19.80	545.00	10,791.00
	19.80	19.80		10,791.00

P.O. #______ Division: VCS II ee-L
W.O. # ______ Acct(s): 1070100
Activity: ______ Resource: 528 Event: ______
Business Unit: ______
Approval: ______ Date: ______

Matter: SCA11A

Invoice: 324446
Page 2 of 2

INVOICE SUMMARY		
	Total of Fees (Time Charges)	$10,791.00
	Total of Costs (Expense Charges)	$0.00
	Total New Charges	**$10,791.00**
	TOTAL BALANCE DUE	**$10,791.00**

Any outside expenses and in-house standard charges not currently posted to the ledger will be included in our next statement.

All invoices are due and payable within 30 days of invoice date.

Federal Tax ID No. 58-0954951

STATEMENT

SMITH, CURRIE & HANCOCK LLP

Cheryl

ATTORNEYS AT LAW

A LIMITED LIABILITY PARTNERSHIP
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TELEPHONE (404) 521-3800

ACCOUNTS PAYABLE
SCANA, SOUTH CAROLINA ELECTRIC & GAS
220 OPERATION WAY
MAIL CODE - C232
CAYCE, SC 29033-3701

August 31, 2015
Client: SCA110
Matter: SCA11A
Invoice # 325039
Bill Atty: GDW

FOR PROFESSIONAL SERVICES RENDERED THROUGH August 31, 2015

RE: V.C. SUMMER NUCLEAR PLANT

08/03/2015	GDW	Exchange several emails with Al Bynum and Steve Pelcher; revise draft of Assessment Agreement; review comments from Bechtel concerning PSA and prepare revised draft; finalize PSA and Attachment A.	4.50hr	$2,452.50
08/04/2015	GDW	Review and revise proposed agreement with contractor concerning Bechtel assessment.	1.70hr	$926.50
08/07/2015	GDW	Review, execute, and distribute Bechtel PSA.	0.50hr	$272.50
08/12/2015	GDW	Review draft BLRA report.	1.10hr	$599.50
08/13/2015	GDW	Review and comment on proposed changes to BLRA Report.	0.80hr	$436.00
08/18/2015	GDW	Review various materials relevant to the Cyber Security issues; revise draft letter to the Consortium concerning the credit due for deletion of thie work.	2.50hr	$1,362.50
08/25/2015	GDW	Telephone conference with Al Bynum concerning Duke's request for documents; revise letter on Cyber Security credit.	0.80hr	$436.00
		TOTAL FEES		**$6,485.50**

Lawyer	Total Hours	Billed Hours	Rate	Amount
GEORGE D WENICK	11.90	11.90	545.00	6,485.50
	11.90	**11.90**		**6,485.50**

INVOICE SUMMARY

Total of Fees (Tima Charges)	$6,485.50
Total of Costs (Expense Charges)	$0.00
Total New Charges	**$6,485.50**
Previous Balance:	$10,791.00
TOTAL BALANCE DUE	**$17,276.50**

P.O. # _____ Division: VCS11 Co: 595
W.O. # 12WD Acct(s): 1070100
Activity: 7004 Resource: 508 Event: 4VC
Business Unit: _____
Approved: _____ Date: 9-21-15

Matter: SCA11A

Invoice: 325039
Page 2 of 2

Open Accounts Receivable

Invoice Number	InvoiceDate	InvoiceTotal	Payments	Adjustments	Interest	OpenTotal
324446	07/31/2015	$10,791.00	$0.00	$0.00	$0.00	$10,791.00
						$10,791.00

Any outside expenses and in-house standard charges not currently posted to the ledger will be included in our next statement.

All invoices are due and payable within 30 days of invoice date.

Federal Tax ID No. 58-0954951

STATEMENT

SMITH, CURRIE & HANCOCK LLP
ATTORNEYS AT LAW
A LIMITED LIABILITY PARTNERSHIP
2700 MARQUIS ONE TOWER
245 PEACHTREE CENTER AVENUE, N.E.
ATLANTA, GA 30303-1227
TELEPHONE (404) 521-3800

ACCOUNTS PAYABLE
SCANA, SOUTH CAROLINA ELECTRIC & GAS
220 OPERATION WAY
MAIL CODE - C232
CAYCE, SC 29033-3701

September 30, 2015
Client: SCA110
Matter: SCA11A
Invoice# 325368
Bill Atty: GDW

FOR PROFESSIONAL SERVICES RENDERED THROUGH September 30, 2015

RE: V.C. SUMMER NUCLEAR PLANT

09/01/2015	GDW	Telephone conference with Ron Lindsay and Al Bynum.	0.50hr	$272.50
09/03/2015	GDW	Telephone conference with Ron Lindsay and Al Bynum; review and revise proposed NDA.	2.20hr	$1,199.00
09/15/2015	GDW	Review WEC proposal and associated documents.	2.20hr	$1,199.00
09/18/2015	GDW	Review relevant materials in advance of conference; conference with Ron Lindsay and Al Bynum; conference with Ron Robey.	3.80hr	$2,071.00
09/29/2015	GDW	Telephone conference with Ron Lindsay and Al Bynum; review materials related to WEC offer and potential counteroffer; participate in call with Owner representatives.	1.20hr	$654.00
		TOTAL FEES		**$5,395.50**

Lawyer	Total Hours	Billed Hours	Rate	Amount
GEORGE D WENICK	9.90	9.90	545.00	5,395.50
	9.90	**9.90**		**5,395.50**

INVOICE SUMMARY		
	Total of Fees (Time Charges)	$5,395.50
	Total of Costs (Expense Charges)	$0.00
	Total New Charges	**$5,395.50**
	TOTAL BALANCE DUE	**$5,395.50**

P. O. #_____ Division: VCS2 OU: 595
W. O. #17000 Acct(s): 1070100
Activity: 7004 Resource: 528 Event_____
Business Use: 4VC
Approval: _____ Date: 11-13

Matter: SCA11A

Invoice: 325368
Page 2 of 2

Any outside expenses and in-house standard charges not currently posted to the ledger will be included in our next statement.

All invoices are due and payable within 30 days of invoice date.

Federal Tax ID No. 58-0954951

STATEMENT
SMITH, CURRIE & HANCOCK LLP
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SCANA, SOUTH CAROLINA ELECTRIC & GAS
220 OPERATION WAY
MAIL CODE - C232
CAYCE, SC 29033-3701

September 30, 2015
Client: SCA110
Matter: SCA11C
Invoice # 325560
Bill Atty: GDW

#14,097.90

FOR PROFESSIONAL SERVICES RENDERED THROUGH September 30, 2015

RE: AUDIT

09/02/2015	RGR	Review materials sent by Iris Griffin; telephone call with Iris Griffin; email searches of Mark Jakiela, Alan Saleeby and Joe Elliott and their businesses; check far any procurement standards in project contract; check far procurement standards for vendors by CB&I or Stone and Webster.	3.10hr	$1,550.00
09/08/2015	RGR	Review additional materials from Iris Griffin and compare signatures and different email addresses.	1.20hr	$600.00
09/09/2015	RGR	Meeting at project site with Iris Griffin and Shirley Johnson; review additional materials provided by Iris Griffin; return to Atlanta.	8.00hr	$4,000.00
09/10/2015	RGR	Review report by investigator; schedule call and 4:00 p.m. telephone call with Iris Griffin and Ken Browne; work an letter analysis to Iris Griffin.	1.90hr	$950.00
09/11/2015	RGR	Work on initial report and information from Iris Griffin.	1.20hr	$600.00
09/13/2015	RGR	Work on letter of legal investigation; complete background research and PeopleMap an Alan Saleeby, Joe Elliott, and Mark Jakelia.	1.80hr	$900.00
09/14/2015	RGR	Transmit complete PeopleMap on Alan Saleeby, Joe Elliott, and Mark Jakelia; finalize and transmit initial results of legal audit.	1.20hr	$600.00
09/14/2015	GEM	Conference with Ron Rabey regarding new matter involving Compuworld Procurement Fraud Investigation; receipt and analysis of Ron's September 14, 2015 letter to client regarding same.	0.60hr	$171.00
09/15/2015	GEM	Begin legal research of governing law for possible civil and criminal fraud claims against CB&I for purchases made from Compuworld on VC Summer EPC Unit 2 project	1.80hr	$513.00
09/16/2015	GEM	Extensive legal research of preliminary issue involving applicability of federal law and/or nuclear oversight regulations to vendors of non-power goods and services; review Federal regulations definitions of "public utility" and evaluate whether the Public Utility Holding Company Act of 2005 applies to V.C. Summers project jointly owned by Scana and Santee Cooper.	4.00hr	$1,140.00
09/16/2015	RGR	Receive additional information from Iris Griffin; conference call with Iris Griffin, William Freund, and Shirley Johnson.	1.20hr	$600.00

Matter: SCA11C

Invoice: 325560
Page 2 of 2

09/17/2015	GEM	Brief conference with Ron Robey regarding latest communications with client about fraud investigation involving vendors procured by Chicago Bridge & Iron; redirect legal research solely to complimentary/ fraudulent bids and South Carolina Unfair Trade Practices Act.	4.30hr	$1,225.50
09/23/2015	RGR	Edit Iris Griffin compliance report.	1.10hr	$550.00

TOTAL FEES **$13,399.50**

Lawyer	Total Hours	Billed Hours	Rate	Amount
GARRETTE MILLER	10.70	10.70	285.00	3,049.50
RONALD G ROBEY	20.70	20.70	500.00	10,350.00
	31.40	**31.40**		**13,399.50**

DISBURSEMENTS

		Amount
09/25/2015	AIR TRAVEL/ RGR/ 9/9/2015 COLUMBIA	$455.10
09/25/2015	OTHER TRAVEL EXPENSES/ RGR/ 9/9/2015 COLUMBIA	$21.75
09/25/2015	CHARGED CAR RENTAL/ RGR/ 9/9/2015 COLUMBIA	$221.55
	TOTAL DISBURSEMENTS	**$698.40**

INVOICE SUMMARY

Total of Fees (Time Charges)	$13,399.50
Total of Costs (Expense Charges)	$698.40
Total New Charges	**$14,097.90**
TOTAL BALANCE DUE	**$14,097.90**

Any outside expenses and in-house standard charges not currently posted to the ledger will be included in our next statement.

All invoices are due and payable within 30 days of invoice date.

Federal Tax ID No. 58-0954951

P.O. #____ Division: VCSII CC: 595
W.O. # 170000 Acct(s): 1070100
Activity: 70DY Resource: ____ Event: ____
Business Use: 4VC
Approval: ____ Date: ____

STATEMENT

SMITH, CURRIE & HANCOCK LLP

ATTORNEYS AT LAW

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TELEPHONE (404) 521-3800

SCANA CORP.
RECEIVED
AUG 10 2015
LEGAL DEPARTMENT

ACCOUNTS PAYABLE
SCANA, SOUTH CAROLINA ELECTRIC & GAS
220 OPERATION WAY
MAIL CODE - C232
CAYCE, SC 29033-3701

July 31, 2015
Client: SCA110
Matter: SCA11A
Invoice # 324446
Bill Atty: GDW

FOR PROFESSIONAL SERVICES RENDERED THROUGH July 31, 2015

RE: V.C. SUMMER NUCLEAR PLANT

07/08/2015	GDW	Review Bechtel proposal; draft professional services agreement; review change order language on price and schedule and suggest changes.	4.20hr	$2,289.00
07/10/2015	GDW	Telephone conference with Al Bynum, Steve Pelcher, and Skip Smith; draft proposed revisions to sections 3 and 9 of draft Change Order; finalize draft Professional Services Agreement and send to Al Bynum and Steve Pelcher.	4.20hr	$2,289.00
07/14/2015	GDW	Prepare proposed revisions to draft Change Order.	0.80hr	$436.00
07/22/2015	GDW	Review draft Change Order 22 and prepare notes for conference call.	1.30hr	$708.50
07/23/2015	GDW	Review materials for call with the contractor; participate in call; prepare redlined version of revised draft; make additional changes to draft to address payment and stop work issues.	3.50hr	$1,907.50
07/28/2015	GDW	Telephone conference with Al Bynum and Steve Pelcher; review and revise draft agreement with contractor concerning Bechtel assessment.	2.30hr	$1,253.50
07/29/2015	GDW	Review contractor's most recent draft of CO 22; review and propose edits to contractor's most recent draft of agreement concerning Bechtel's assessment.	2.00hr	$1,090.00
07/30/2015	GDW	Make additional revisions to draft Assessment Agreement.	1.50hr	$817.50

TOTAL FEES $10,791.00

Lawyer	Total Hours	Billed Hours	Rate	Amount
GEORGE D WENICK	19.80	19.80	545.00	10,791.00
	19.80	19.80		10,791.00

P.O. # ______ Division: VCS II ______
W. O. # 17 ______ Acct(s): 1070100
Activity ______ Resource: 528
Business Unit ______
Approval: ______ Date: ______

Matter: SCA11A

Invoice: 324446
Page 2 of 2

INVOICE SUMMARY		
	Total of Fees (Time Charges)	$10,791.00
	Total of Costs (Expense Charges)	$0.00
	Total New Charges	$10,791.00
	TOTAL BALANCE DUE	$10,791.00

Any outside expenses and in-house standard charges not currently posted to the ledger will be included in our next statement.

All invoices are due and payable within 30 days of invoice date.

Federal Tax ID No. 58-0954951

Cheryl

STATEMENT

SMITH, CURRIE & HANCOCK LLP

ATTORNEYS AT LAW

A LIMITED LIABILITY PARTNERSHIP
2700 MARQUIS ONE TOWER
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ATLANTA, GA 30303-1227

TELEPHONE (404) 521-3800

ACCOUNTS PAYABLE
SCANA, SOUTH CAROLINA ELECTRIC & GAS
220 OPERATION WAY
MAIL CODE - C232
CAYCE, SC 29033-3701

August 31, 2015
Client: SCA110
Matter: SCA11A
Invoice # 325039
Bill Atty: GDW

FOR PROFESSIONAL SERVICES RENDERED THROUGH August 31, 2015

RE: V.C. SUMMER NUCLEAR PLANT

08/03/2015	GDW	Exchange several emails with Al Bynum and Steve Pelcher; revise draft of Assessment Agreement; review comments from Bechtel concerning PSA and prepare revised draft; finalize PSA and Attachment A.	4.50hr	$2,452.50
08/04/2015	GDW	Review and revise proposed agreement with contractor concerning Bechtel assessment.	1.70hr	$926.50
08/07/2015	GDW	Review, execute, and distribute Bechtel PSA.	0.50hr	$272.50
08/12/2015	GDW	Review draft BLRA report.	1.10hr	$599.50
08/13/2015	GDW	Review and comment on proposed changes to BLRA Report.	0.80hr	$436.00
08/18/2015	GDW	Review various materials relevant to the Cyber Security issues; revise draft letter to the Consortium concerning the credit due for deletion of this work.	2.50hr	$1,362.50
08/25/2015	GDW	Telephone conference with Al Bynum concerning Duke's request for documents; revise letter on Cyber Security credit	0.80hr	$436.00
		TOTAL FEES		**$6,485.50**

Lawyer	Total Hours	Billed Hours	Rate	Amount
GEORGE D WENICK	11.90	11.90	545.00	6,485.50
	11.90	**11.90**		**6,485.50**

INVOICE SUMMARY

Total of Fees (Time Charges)	$6,485.50
Total of Costs (Expense Charges)	$0.00
Total New Charges	**$6,485.50**
Previous Balance:	$10,791.00
TOTAL BALANCE DUE	**$17,276.50**

P.O. # _____ Division: VCS11 CC: 595
W.O. # 12WJD Acct(s): 1070100
Activity: 7004 Resource: 508 Event: 4VC
Business Unit: _____
Approval: _____ Date: 9-21-15

Matter: SCA11A

Invoice: 325039
Page 2 of 2

Open Accounts Receivable

Invoice Number	InvoiceDate	InvoiceTotal	Payments	Adjustments	Interest	OpenTotal
324446	07/31/2015	$10,791.00	$0.00	$0.00	$0.00	$10,791.00
						$10,791.00

Any outside expenses and in-house standard charges not currently posted to the ledger will be included in our next statement.

All invoices are due and payable within 30 days of invoice date.

Federal Tax ID No. 58-0954951

SCE&G
A SCANA COMPANY

Stephen A. Byrne
President Generation & Transmission & COO
sbyrne@scana.com

September 25, 2014
NND-14-0600

Jeff Lyash
President, Power
CB&I Stone & Webster
128 S. Tryon Street, Suite 100
Charlotte, NC 28202

Subject: V.C. Summer Units 2 and 3 Guaranteed Substantial Completion Dates

Reference:
(1) Engineering, Procurement, and Construction Agreement for AP 1000 Nuclear Power Plants, Dated May 23, 2008 – V.C. Summer Units 2 and 3
(2) VSP_VSG_002024, dated August 6, 2012
(3) Owner's unnumbered letter, dated May 6, 2014
(4) VSP_VSG_002819, dated July 16, 2014
(5) VSP_VSG_002861, dated July 25, 2014
(6) Consortium's unnumbered letter, dated July 25, 2014
(7) VSS_VSG_002044, dated September 16, 2014

Dear Mr. Lyash:

The Consortium's letter of July 16, 2014 (reference 4), its two letters of July 25, 2014 (reference 5 and 6), and your letter of September 16, 2014 (reference 7) address three issues to which we wish to respond here, with the hope of putting them to rest.

The first issue is the cause of the various project delays that appear certain to prevent the Consortium from achieving the agreed Guaranteed Substantial Completion Dates (GSCDs) of March 15, 2017, and May 15, 2018. The second issue is the Consortium's contention that it should benefit from its unexcused delays by receiving excess escalation payments. The third issue is the Consortium's analogous contention

that it should benefit from certain Project Payment Schedules, although those schedules are out of sync with the Consortium's actual progress due to its unexcused delays.

I. THE CONSORTIUM IS RESPONSIBLE FOR THE CURRENT PROJECT DELAYS

With respect to the first issue—the cause of the project delays—the Owner provided a detailed account of the Consortium's performance deficiencies relating to the structural modules and project design, in its letter of May 6, 2014 (Reference 3). That account was incomplete. It did not provide an exhaustive list of all the Consortium's performance deficiencies or a complete statement of the Owner's damages. Nonetheless, it was sufficient to show that the Project Delays are the Consortium's responsibility.

The Consortium indirectly responded to our account in its letter of July 16, 2014 (Reference 4) by denying that it is responsible for all costs associated with the Project delays. The Consortium had not previously identified any circumstances or events that would justify a schedule extension, and even its July 16, 20141etter failed to do so. Although that letter alluded to regulatory-driven changes and unforeseeable events that complicated the Consortium's task of re-baselining the Project Schedule, the letter provided no details about those matters and fell well short of the EPC Agreement standards for Notice of a Change. The Consortium responded more directly to our account in its letter of July 25, 2014 (Reference 6) but still did not provide any details to justify the delays. The letter merely referred vaguely to regulatory-driven changes and events that allegedly impacted the Consortium's efficiency.

We conclude from all this that the Consortium has no grounds for a Change to the Project Schedule and all Project delays to date are unexcused. We address certain implications of these unexcused delays in the next two sections of this letter.

II. THE CONSORTIUM IS NOT ENTITLED TO EXCESS ESCALATION PAYMENTS

The second issue relates to escalation payments. The EPC Agreement was originally priced using 2007 dollars. Under that agreement, the Consortium agreed to perform in accordance with the Project Schedule, with the understanding that the Owner would make escalated payments in later calendar years for Firm Price work completed according to the Project Schedule.

In its letters, the Consortium contends that, where the Consortium fails to complete the various parts of the Project when agreed, the Owner must continue to escalate the Milestone Payments until the Consortium finally does complete such parts of the Project, regardless of the cause of the delay. This contention inappropriately divorces the Price Adjustment Provisions from the context of the EPC Agreement. Under that agreement, the Price Adjustment Provisions are interconnected with the Milestone Payment Schedules and the Project Schedule. These interconnected components of the EPC Agreement require the Contractor to perform in accordance with the Project Schedule and condition escalation of Milestone Payments on the Consortium's timely completion of the Project Schedule activities. Nothing in the EPC Agreement or normal business practices suggests that the Consortium should reap a financial benefit, in the form of excess escalation payments, when the Consortium is responsible for late completion of the Milestones.

To support its contention about excess escalation payments, the Consortium points to the Liquidated Damages provision in the EPC Agreement. That provision states that Liquidated Damages are the Owner's exclusive remedy for the Consortium's failure to achieve Substantial Completion of a Unit on or before the GSCD for such Unit. The Liquidated Damages provision does not control the excess escalation question, however, because neither of two key features of that provision applies here. The Owner is not seeking at this time any additional remedy beyond Liquidated Damages. And the excess escalation payments in question are not associated with delays to the GSCDs.

The Liquidated Damages provision does not control the escalation issue, because the Owner is not seeking a remedy with respect to excess escalation payments. Instead, it is the Consortium that is seeking a remedy, namely, the recovery of excess escalation payments associated with its unexcused delay. If the Consortium intended to assert a Claim for delay damages, such as escalation costs, the Consortium would have to comply with the Claim provisions of the EPC Agreement and show, among other things, that the delays were excusable. In addition, the Consortium would also have to show that it actually incurred additional escalation costs in connection with the Milestone payments. The Liquidated Damages provision does nothing to relieve the Consortium of these requirements, neither of which the Consortium has met or could meet.

The Liquidated Damages provision also does not control the excess escalation issue because it does not address the Owner's remedies for late completion of Project Milestones. That provision expressly applies only to late Substantial Completion. The daily Liquidated Damages amounts are reasonably related to the revenue that the

Owner would lose by not being able to produce and sell power in the event of delays to Substantial Completion. Consequently, the Liquidated Damages provision is limited to late Substantial Completion and establishes the exclusive remedy for the Consortium's failure to achieve Substantial Completion by the agreed GSCDs, but only for such failure. The Liquidated Damages provision does not exclude or limit the Owner's remedies for other Consortium delays, such as the Consortium's failure to achieve Milestones on the dates stated in the Project Schedule. The Liquidated Damages provision is silent as to those other delays and, therefore, does not limit the Owner's associated remedies.

In its letters of July 25, 2014 (reference 5) and September 16, 2014 (reference 7), the Consortium requests that the Owner make partial payment of the excess escalation amounts, pending resolution of the dispute, under Article 8 of the EPC Agreement. We acknowledge that Article 8 addresses payment for disputed Claims, but that article is subject to several limitations. First and foremost, the article is limited by the parties' mutual obligation to deal with one another fairly and in good faith. Due to this limitation, the Consortium could not bill the Owner for completely unrelated items, such as work on Plant Vogtle, or, if it did so, it would have no right to payment of 90% of the invoiced amount, pending resolution of the inevitable dispute.

Billings for disputed Claims are also subject to additional limitations imposed by other parts of the EPC Agreement. For example, Article 27 requires that a Claim be initiated by written notice and makes such notice a condition precedent to any further proceedings with respect to a Claim. That article also puts the burden of substantiating a Claim on the Party making the Claim. Article 9 states that any changed work performed before execution of a Change Order is at the Consortium's risk.

The limitations imposed by Article 9 and 27 must be read together with Article 8. In combination, these articles do not require any payment for a disputed Claim until the Consortium first takes certain steps to establish the Claim. The steps include giving proper notice and providing supporting information to substantiate the Claim. As noted above, the Consortium has not taken any of the necessary steps.

III. CERTAIN PROJECT PAYMENTS SCHEDULES SHOULD BE ADJUSTED

The third issue relates to certain Project Payment Schedules that are calendar-based but are out of sync with the Consortium's currently anticipated completion dates of the Project components. Those Payment Schedules, in their current form, would require full payment well in advance of when the Consortium expects to complete the

Project. The disconnect is almost certain to worsen with the upcoming re-baselined work schedule.

We have addressed this problem by rejecting recent requests for payments that were not justified by the Consortium's current Project Schedule, although we have not approved that schedule. Once we accept the new re-baselined work Project Schedule, we will reject payments that are not justified by the re-baselined Project Schedule. The justification for these adjustments is much the same as the justification, stated above, for not making excess escalation payments. The Consortium has no right to be rewarded for unexcused Project delays by receiving payment in advance of when it actually performs the work.

Please advise if you have any questions about these matters.

Sincerely,

Stephen A. Byrne
President, Generation & Transmission
South Carolina Electric & Gas

Jones/Smith/lw

cc: Ronald Jones - SCE&G
Carlette Walker - SCE&G
Al Bynum - SCE&G
Alan Torres - SCE&G
Brad Stokes - SCE&G
April Rice - SCE&G
Roosevelt Word - SCE&G
Larry Cunningham - SCE&G

David Lavigne - SCE&G

Marion Cherry - Santee Cooper
Christopher Levesque - Westinghouse
Joel Hjelseth - Westinghouse

JoAnne Hyde
Westinghouse
Linda Ackerman - Westinghouse
Ken Hollenbach- CB&I S&W
Charlie White – CB&I S&W
Kenneth Jenkins - CB&I S&W
VCSummer2&3ProjectMail@Shawgrp.com
vcsummer2&3project@westinghouse.com
VCS N N DCorrespondence@scana.com
DCRM-EDMS@scana.com

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Nuclear Power Plants
1000 Westinghouse Drive, Suite 112
Cranberry Township, PA 16066
USA

Mr. Abney A. Smith
South Carolina Electric & Gas Company
New Nuclear Deployment
PO Box 88
Jenkinsville, SC 29065

VIA: E-Mail

Telephone: (412) 374-5650
Fax: (724) 940-8521
Email: hydej@westinghouse.com

Our Reference: VSP_VSG_002968

September 25, 2014

Subject: **First and Second Notices of Unpaid CB&I Stone & Webster, Inc. Invoices Pursuant to Section 8.4(c) of the EPC Agreement**

References:
1) Engineering, Procurement, and Construction Agreement for AP1000® Nuclear Power Plants, Dated May 23, 2008 – V.C. Summer Units 2 and 3 ("Agreement")
2) CB&I Stone & Webster Invoice No. 1529816 due August 29, 2013 for $52,473
3) NND-13-0478, "CB&I/Stone & Webster Target Invoice 1529816-R8-00360," Dated August 22, 2013
4) CB&I Stone & Webster Invoice No. 1602383 due December 1, 2013 for $360,549
5) NND-13-0694, "Partial Return of CB&I/Stone & Webster Target Price Invoice 1602383-R8-00360, dated November 11, 2013," Dated November 25, 2013
6) CB&I Stone & Webster Invoice No. 1620649 due December 26, 2013 for $15,984
7) NND-13-0746, "Partial Return of CB&I/Stone & Webster Target Price Invoice 1620649-R8-00360, dated December 6, 2013," Dated December 19, 2013
8) CB&I Stone & Webster Invoice No. 1646382 due January 30, 2014 for $80,333
9) NND-14-0046, "Partial Return of CB&I/Stone & Webster Target Price Invoice 1646382-R8-00360, dated January 10, 2014," Dated January 27, 2014
10) CB&I Stone & Webster Invoice No. 1669753-R8-00360, due February 27, 2014 for $85,101
11) NND-14-0097, "Partial Return of CB&I/Stone & Webster Target Price Invoice 1669753-R8-00360, dated February 10, 2014," Dated February 24, 2014
12) CB&I Stone & Webster Invoice No. 1697884-R8-00360, due March 27, 2014 for $116,675

Westinghouse

CB&I Stone & Webster, Inc.

13) NND-14-0157, "Partial Return of CB&I/Stone & Webster Target Price Invoice 1697884-R8-00360," dated March 7, 2014," Dated March 21, 2014
14) CB&I Stone & Webster Invoice No. 1716927 due April 24, 2014 for $46,713
15) NND-14-0213, "Partial Return of CB&I/Stone & Webster Target Price Invoice 1716927-R8-00360, dated April 4, 2014," Dated April 21, 2014
16) VSP_VSG_002753, "Section 8.4 of the Agreement," Dated May 7, 2014
17) VSP_VSG_002757, "Response to NND-14-0213, 'Partial Return of CB&I/ Stone & Webster Target Price Invoice 1716927-R8-00360, dated April 4, 2014'," Dated May 8, 2014
18) CB&I Stone & Webster Invoice No. 1756516 due May 26, 2014 for $20,072
19) NND-14-0286, "Partial Return of CB&I/Stone & Webster Target Price Invoice 1756516-R8-00360, dated May 6, 2014," Dated May 20, 2014
20) VSP_VSG_002783, "Response to NND-14-0286, 'Partial Return of CB&I/ Stone & Webster Target Price Invoice 1756516-R8-00360, dated May 6, 2014'," Dated May 30, 2014
21) CB&I Stone & Webster Invoice No. 1794841 due July 25, 2014 for $26,564,853
22) NND-14-0375, "Return of CB&I/Stone & Webster, Inc. F.1.5 Milestone Invoice 1794841-R8-00361, dated June 25, 2014," Dated June 30, 2014
23) CB&I Stone & Webster Invoice No. 1798659 due July 31, 2014 for $571,526
24) NND-14-0411, "July 2014 Escalation for EPC F.1.3 and F.1.5 Invoices," Dated July 16, 2014
25) CB&I Stone & Webster Invoice No. 1832044 due August 28, 2014 for $2,440,778
26) NND-14-0497, "Partial Return of CB&I/Stone & Webster Target Price Invoice 1832044-R8-00360, dated August 8, 2014," Dated August 25, 2014

Action: **Remit Payment of Invoices Contained Herein in Accordance with Section 8.4(c)**

Dear Mr. Smith:

There has been considerable correspondence between Contractor and Owner concerning Owner's refusal to pay various invoices due to Contractor, including but not limited to, the correspondence and invoices referenced above. The listed invoices do not include the unpaid CB&I Stone & Webster, Inc. (Stone & Webster) invoices which Contractor understands will be paid upon the execution of Change Orders No. 16 and 17.

Contractor, specifically Stone & Webster, has made its position clear with respect to our entitlement to payment under the Agreement and therefore do not believe it constructive to continue further dialogue on this issue. Suffice to say, the Owner has not provided a valid contractual basis under the Agreement justifying its refusal to pay the full amount of the invoices submitted. Assuming there was a valid, good faith, contractual dispute between the Parties, the Owner is still obligated to pay the entire disputed amount under $1,000,000 and ninety percent (90%) of any disputed amount exceeding $1,000,000. Owner's position that it can deem an invoice "deficient" or otherwise withhold all or partial payments is not grounded in either the intent or the plain language of the Agreement. The Owner's withholding of payments due on numerous invoices is without legitimate basis and is in direct contravention of the terms of the Agreement.

Consequently, pursuant to Section 8.4(c) of the Agreement, this shall constitute Stone & Webster's first notice of Owner's failure to pay the following invoices by their due date:

Invoice No.	Due Date	Amount
1529816-R8-00360	8/29/2013	$ 52,473
1794841-R8-00360	7/25/2014	$ 26,564,853
1798659-R8-00360	7/31/2014	$ 571,526
1832044-R8-00360	8/28/2014	$ 2,440,778

In the event that the Owner fails to pay such amounts within seven (7) Days of its receipt hereof, Stone & Webster will proceed to exercise its rights in accordance with the terms of the Agreement.

In addition, pursuant to Section 8.4(c) of the Agreement, this shall constitute Stone & Webster's second notice of Owner's failure to pay the following invoices by their due date:

Invoice No.	Due Date	Amount
1602383-R8-00360	12/1/2013	$ 360,549
1620649-R8-00360	12/26/2013	$ 15,984
1646382-R8-00360	1/30/2014	$ 80,333
1669753-R8-00360	2/27/2014	$ 85,101
1697884-R8-00360	3/27/2014	$ 116,675
1716927-R8-00360	4/24/2014	$ 46,713
1756516-R8-00360	5/26/2014	$ 20,072

In the event that the Owner fails to pay these invoices within fifteen (15) Days of the Owner's receipt of this letter, Owner is advised that in accordance with Section 8.4(c) of the Agreement, "If Owner fails to make payment of the undisputed amount due within fifteen (15) Days following its receipt of this second notice, Contractor has the right to suspend performance of the Work as if Owner had ordered a suspension in accordance with Section 22.1." The Consortium expressly reserves its right to do so along with exercising its rights under Section 22.5 to terminate the Agreement and any other remedy available to it.

If you have any questions, please feel free to contact Charlie White at (980) 321-8588 or the undersigned.

Sincerely,

JEFF COWARD FOR

Jeff Coward for

JoAnne W. Hyde
Consortium Commercial Director
Westinghouse Electric Company LLC

LAV/SNM/JLC/cef

cc: Ronald A. Jones – SCE&G
Alan D. Torres – SCE&G
Carlette Walker – SCE&G
Robert B. Stokes – SCE&G
April Rice – SCE&G
David Lavigne – SCE&G
Larry Cunningham – SCE&G
Roosevelt Word – SCE&G
Ken Browne – SCE&G
Al Bynum – SCE&G
Guy Bradley – SCE&G
Marion Cherry – SCE&G
Christopher Levesque – Westinghouse
Joel Hjelseth – Westinghouse
Daniel Churchman – Westinghouse
Daniel Magnarelli – Westinghouse
Brian McIntyre – Westinghouse
William Macecevic – Westinghouse
Travis Tomb – Westinghouse
Jeff Coward – Westinghouse
Michael Frankle – Westinghouse
Luke Miller – Westinghouse
Linda Ackerman – Westinghouse
Duane Olcsvary – Westinghouse
Susan May – Westinghouse
Denise Cervenyak – Westinghouse
Kenneth Hollenbach – CB&I Stone & Webster
Sean Burk – CB&I Stone & Webster
William O. Wood – CB&I Stone & Webster
Mehdi Maibodi – CB&I Stone & Webster
Charlie White – CB&I Stone & Webster
Lucinda Vasbinder – CB&I Stone & Webster
Dale Garrison – CB&I Stone & Webster
Brian Hobbs – CB&I Stone & Webster
Kenneth Jenkins – CB&I Stone & Webster
A. J. Marciano – CB&I Stone & Webster
Joseph Arostegui – CB&I Stone & Webster
Rebecca Russell – CB&I Stone & Webster
Mike Marconi – CB&I Stone & Webster
Benny Buras – CB&I Stone & Webster
Mark Glover – CB&I Stone & Webster
Brandon Lauerman – CB&I Stone & Webster
Tom Moran – CB&I Stone & Webster
Ian Hunt – CB&I Stone & Webster
Jessica Dills – CB&I Stone & Webster
Thomas Hopkins – CB&I Stone & Webster
DCRM-EDMS@scana.com
VCSNNDCorrespondence@scana.com
VCSummer2&3ProjectMail@cbi.com
VCSummer2&3Project@westinghouse.com

- EXPERTS
- Δ CODE COMM AGE 349
- STBY SUPPORT
- EXPECT FRIDAY

NEGOTIATION PRE-MEETING 12/19/11

BY MTG MONDAY

[illegible] TO 14 [illegible] WEEK REVIEW TUESDAY FRIDAY [illegible] MAY [illegible] SAY TIED TO

2 CHG NOTICES [illegible] "SUPPLEMENTAL CHANGES" TIED TO PREVIOUS CHANGES.

- ONE [illegible] [illegible]
- 14 [illegible] BINDERS OF SUPPORTING DOCUMENTATION

MS - [illegible] [illegible] $ [illegible] INVOICE STARTING IN AUGUST

GW - RAISE [illegible] MONDAY - WE DON'T AGREE CHANGE = SO NOT OBLIGATED TO PAY 90% FROM ARTICLE 8.4

LFR - OWNER DOESN'T INTEND TO PAY THE 90%

[illegible] = 10.2 REQUIRES WEEKLY UPDATES; ARE THEY/HAVE THEY BEEN DOING

AB = BEEN GETTING WEEKLY UPDATES ON
- VOLCANO / CERAMICS
- MANGIAROTTI
- STRIKE

MS - 9.4 - IF CONSORTIUM PROCEEDS W/O OWNER APPROVAL - AT THEIR OWN RISK

GW - NEED TO ENGAGE CONSULTANTS (FORENSIC ACCOUNTING, SCHEDULING, CIVIL...) INDEPENDENT LOOK

MB - SAME CONSULTANTS WOULD BE USEFUL IF GO TO LITIGATION

GW - COULD WE SUE & KEEP IN SC.? LIKELY FED COURT.

→ NOT PROBABLE

[illegible] 8.4 [illegible] = DISPUTE NOT SETTLED IN 30 DAYS OWNER PAYS

GW - OUR [illegible] CHANGE - WE WOULD CONTEND NO CHANGE.

- IF WE AGREE THERE IS A CHG BUT ARGUE ABOUT COST THEN WE PAY %

MC - N [illegible] EXPS W/ $70M CHANGE ORDER LTRS
- TIER 2 VERBATIM COMPLIANCE
- CODE INTERPRETATION - BUT MAY NOT BE SUPPORTED

LC - CBI [illegible] [illegible] - POSSIBLY DECLARE BANKRUPTCY IN NXT [illegible].

NOBODY WINS IF GETS BEFORE BANKRUPTCY JUDGE

AB - AGREE ON SKED W/O RESET GSCDs

LC - MAYBE CBI WALK OFF NOW. BIGGEST THING - SEE IF TOSHIBA STEPS UP.

MB - CONCERN [illegible] PAYMENTS

Phone Call w/ George Wenick [illegible]

Westinghouse "Notice of Claims" - #1.5 Million
We dispute, so no need to pay [illegible]
Doesn't meet the definition of "change"

Kenny? CAN we revise schedule W/ [illegible] w/o
commitment for cost?

Begin looking for experts from the outside:
Forensic Accounting
Civil engineering
Scheduling

Need to respond to Westinghouse notice
of "claims" w/in 15 days of last Friday

Type: Calendar
Organizer: Hartley, Amy
Subject: Meeting w/ Kevin Marsh & Steve Byrne
Location: SCANA Headquarters
Start: 02/17/2015 02:00:00 PM -0500 (EST)
End: 02/17/2015 03:00:00 PM -0500 (EST)
All Day Event: False
To: Hartley, Amy; Crosby, Michael; Watson, Marty; Carter, Lonnie
CC: ROWLAND, PAULA
BCC:
Sent On: 02/13/2015 10:58:54 AM -0500 (EST)
Attachments:

SANTEE MTG LONNIE / MARY WATSON KBM / SAB / MIKE CROSBY

LC LC BELIEVES MORE THAN EVEN CHANCE OF ADDTNL DELAY

BETTER INFO FOR US

WANT INDEP ASSMNT OF SKED - AMMO FOR DEALING W/ STAKEHOLDERS

ONE OF BOARD MEMBERS RELATIONSHIP W/ FORMER CEO BECHTEL MIKE [illegible]

BECHTEL THINKS THEY HAVE GOOD RELATIONSHIP W/ WEC.

L BECHTEL TURNED DOWN ASSISTING ON WEC CHINA PROJECTS

" GAVE SANTEE [illegible] ON WHAT THEY CAN DO.

DON'T THINK ANY DISCLOSURE ISSUES - CONSORTIUM MAY OBJECT ON LEGAL GROUNDS.

MC SMCI JUSTIFIES [illegible] AS CBI-LC - DESIGN ISSUES BIGGER THAN CONSORTIUM IS LETTIN' ON

LC THE CONSORTIUM IS MISLEADING US - NOT IN A CRIMINAL WAY

LC BELIEVES WE COULD FORCE THEM (CB&I) TO COOPERATE

[illegible] COMPANY USED BY DOE ON LOAN GUARANTEE MPRE

LC [illegible] FOR DELAY

MC [illegible] REPORT LACKING

[illegible] SHOULD SEE IF SOUTHERN IS INTERESTED

(J) BY 12 FOR COMPLETION

KM DISCUSSED PROPOSED COUNTER - BIG BONUS IF (J) FOR $1.2b CAP [illegible] $500M ISH

☒ [illegible] WTP
☒ BIG DIG
☒ FPL [illegible]

4/7/15

☒ WHAT DO
☒ [illegible] ACCOUNT PSC
☒ OTHER ASSMNTS

☒ WITNESS [illegible] (O) HELP [illegible]
☒ WHO [illegible]
☒ EVAL [illegible]
☒ TALKING TO VOGTLE

3. Recommendation: To improve DOE's management and oversight of the WTP project, the Secretary of Energy should take appropriate steps to determine whether any incentive payments made to the contractor for meeting project milestones were made erroneously and, if so, take appropriate actions to recover those payments.

Agency Affected: Department of Energy

Status: Open

Comments: When we confirm what actions the agency has taken in response to this recommendation, we will provide updated information.

BECHTEL MTG KBM/SAB/MIKE CROSBY/MARTY

MIKE [illegible] - [illegible] CFO - [illegible] SANTEE [illegible] MEMBER
C [illegible] ALBERT - USED TO WORK FOR WEC
CARL [illegible] = RETIRED, CONSULTANT

MR = HAS GOOD KNOWLEDGE OF CBI FINANCIAL SITUATION, AWARE OF INTER-CONSORTIUM ISSUES
= HAVE DONE ASSESSMENTS BEFORE

CA = BECHTEL RECENT REORGANIZATION. COMBINED GOVT & NON-GOVT NUCLEAR BIZ [illegible]
STRATEGIC [illegible] MTG. - NEED SUCCESS [illegible] VOGTLE FOR MORE NUCLEAR WORK IN U.S.

CURRENTLY FINISHING WATTS BAR, [illegible] DEC. 2015 = W/ LESSONS LEARNED SINCE CONTRACT SIGN IN [illegible]
HELPING [illegible] W/ HINKLEY IN UK
DID 2012 ASSMNT @ [illegible] FOR CNNC.

NOT INTERESTED IN REPLACING ANYONE

KB - HOW CBI VIEW BECHTEL

CA - INITIALLY NOT WELL, CONCERN OF OWNER ENGINEER (I THINK THIS IS WHAT THEY WANT) NOT [illegible] FOR THEM

CA [illegible] AS POTENTIALLY MORE DIFFICULT THAN CBI

CA - CURRENTLY HELPING TVA W/ [illegible]. AREVA WOULD NOT [illegible] INITIALLY [illegible]
= [illegible] @ VOGTLE U1 & 2 - SUCCEEDED TO UTILITY - [illegible] CONTRACTORS
= [illegible] AFTER [illegible] AS WITNESSES IN PRUDENCY HEARINGS.

CA = IDEA OF ASSMNT IS TO START - MAYBE [illegible];
INTEND TO HAVE CARL OVERSEE ASSESSMENT

KB [illegible] TO START & COMPLETE ASSMNT, ASSUMING CBI ALLOWS

CA - COULD START IN A FEW WEEKS - 2 MONTHS +
[illegible] WEEKS DATA GATHER
7 WEEKS TO EVAL/COMPILE/STUDY
REPORT OUT

— WILL NEED [illegible]

WILL EVALUATE [illegible] MGT, ENG, PROCUREMENT, CONSTRUCTION, "MODULE YARDS," RECOMMENDATIONS [illegible]

[illegible] WITNESS? - CA WOULD HAVE TO EVALUATE

THEY HAVE NOT YET TALKING TO VOGTLE.

BECHTEL HAS 3 PEOPLE @ VOGTLE 3/4 ([illegible])

$1M ESTIMATE. - BALLPARKED. [illegible]

HANFORD WASTE TREATMENT PLANT:

DOE Needs to Take Action to Resolve Technical and Management Challenges

GAO-13-38: Published: Dec 19, 2012. Publicly Released: Jan 18, 2013.

What GAO Found

The Department of Energy (DOE) faces significant technical challenges in successfully constructing and operating the Waste Treatment and Immobilization Plant (WTP) project that is to treat millions of gallons of highly radioactive liquid waste resulting from the production of nuclear weapons. DOE and Bechtel National, Inc. identified hundreds of technical challenges that vary in significance and potential negative impact and have resolved many of them. Remaining challenges include (1) developing a viable technology to keep the waste mixed uniformly in WTP mix tanks to both avoid explosions and so that it can be properly prepared for further processing; (2) ensuring that the erosion and corrosion of components, such as tanks and piping systems, is effectively mitigated; (3) preventing the buildup of flammable hydrogen gas in tanks, vessels, and piping systems; and (4) understanding better the waste that will be processed at the WTP. Until these and other technical challenges are resolved, DOE will continue to be uncertain whether the WTP can be completed on schedule and whether it will operate safely and effectively.

Since its inception in 2000, DOE's estimated cost to construct the WTP has tripled and the scheduled completion date has slipped by nearly a decade to 2019. GAO's analysis shows that, as of May 2012, the project's total estimated cost had increased to $13.4 billion, and significant additional cost increases and schedule delays are likely to occur because DOE has not fully resolved the technical challenges faced by the project. DOE has directed Bechtel to develop a new cost and schedule baseline for the project and to begin a study of alternatives that include potential changes to the WTP's design and operational plans. These alternatives could add billions of dollars to the cost of treating the waste and prolong the overall waste treatment mission.

DOE is taking steps to improve its management and oversight of Bechtel's activities but continues to face challenges to completing the WTP project within budget and on schedule. DOE's Office of Health, Safety, and Security has conducted investigations of Bechtel's activities that have resulted in penalties for design deficiencies and for multiple violations of DOE safety requirements. In January 2012, the office reported that some aspects of the WTP design may not comply with DOE safety standards. As a result, DOE ordered Bechtel to suspend work on several major WTP systems, including the pretreatment facility and parts of the high-level waste facility, until Bechtel can demonstrate that activities align with DOE nuclear safety requirements. While DOE has taken actions to improve performance, the ongoing use of an accelerated approach to design and construction--an approach best suited for well-defined and less-complex projects--continues to result in cost and schedule problems, allowing construction and fabrication of components that may not work and may not meet nuclear safety standards. While guidelines used in the civilian nuclear industry call for designs to be at least 90 percent complete before construction of nuclear facilities, DOE estimates that WTP is more than 55 percent complete though the design is only 80 percent complete. In addition, DOE has experienced continuing problems overseeing its contractor's activities. For example, DOE's incentives and management controls are inadequate for ensuring effective project management, and GAO found instances where DOE prematurely rewarded the contractor for resolving technical issues and completing work.

Why GAO Did This Study

In December 2000, DOE awarded Bechtel a contract to design and construct the WTP project at DOE's Hanford Site in Washington State. This project--one of the largest nuclear waste cleanup facilities in the world-- was originally scheduled for completion in 2011 at an estimated cost of $4.3 billion. Technical challenges and other issues, however, have contributed to cost increases and schedule delays. GAO was asked to examine (1) remaining technical challenges, if any, the WTP faces; (2) the cost and schedule estimates for the WTP; and (3) steps DOE is taking, if any, to improve the management and oversight of the WTP project. GAO reviewed DOE and contractor data and documents, external review reports, and spoke with officials from DOE and the Defense Nuclear Facilities Safety Board and with contractors at the WTP site and test facilities.

What GAO Recommends

GAO recommends that DOE (1) not resume construction on WTPs pretreatment and high-level waste facilities until, among other things, the facilities design has been completed to the level established by nuclear industry guidelines; (2) ensure the departments contractor performance evaluation process does not prematurely reward contractors for resolving technical issues later found to be unresolved; and (3) take appropriate steps to determine whether any incentive payments were made erroneously and, if so, take actions to recover them. DOE generally agreed with the report and its recommendations.

For more information, contact David C. Trimble at (202) 512-3841 or trimbled@gao.gov.

Recommendations for Executive Action

1. **Recommendation**: To improve DOE's management and oversight of the WTP project, the Secretary of Energy should not resume construction on the WTP's pretreatment and high-level waste facilities until critical technologies are tested and verified as effective, the facilities' design has been completed to the level established by nuclear industry guidelines, and Bechtel's preliminary documented safety analyses complies with DOE nuclear safety regulations. **Agency Affected**: Department of Energy	**Status**: Open **Comments**: When we confirm what actions the agency has taken in response to this recommendation, we will provide updated information.
2. **Recommendation**: To improve DOE's management and oversight of the WTP project, the Secretary of Energy should ensure the department's contractor performance evaluation process does not prematurely reward contractors for resolving technical issues later found to be unresolved. For example, DOE could seek to modify its contracts to withhold payment of incentive fees until the technical challenges are independently verified as resolved. **Agency Affected**: Department of Energy	**Status**: Open **Comments**: When we confirm what actions the agency has taken in response to this recommendation, we will provide updated information.

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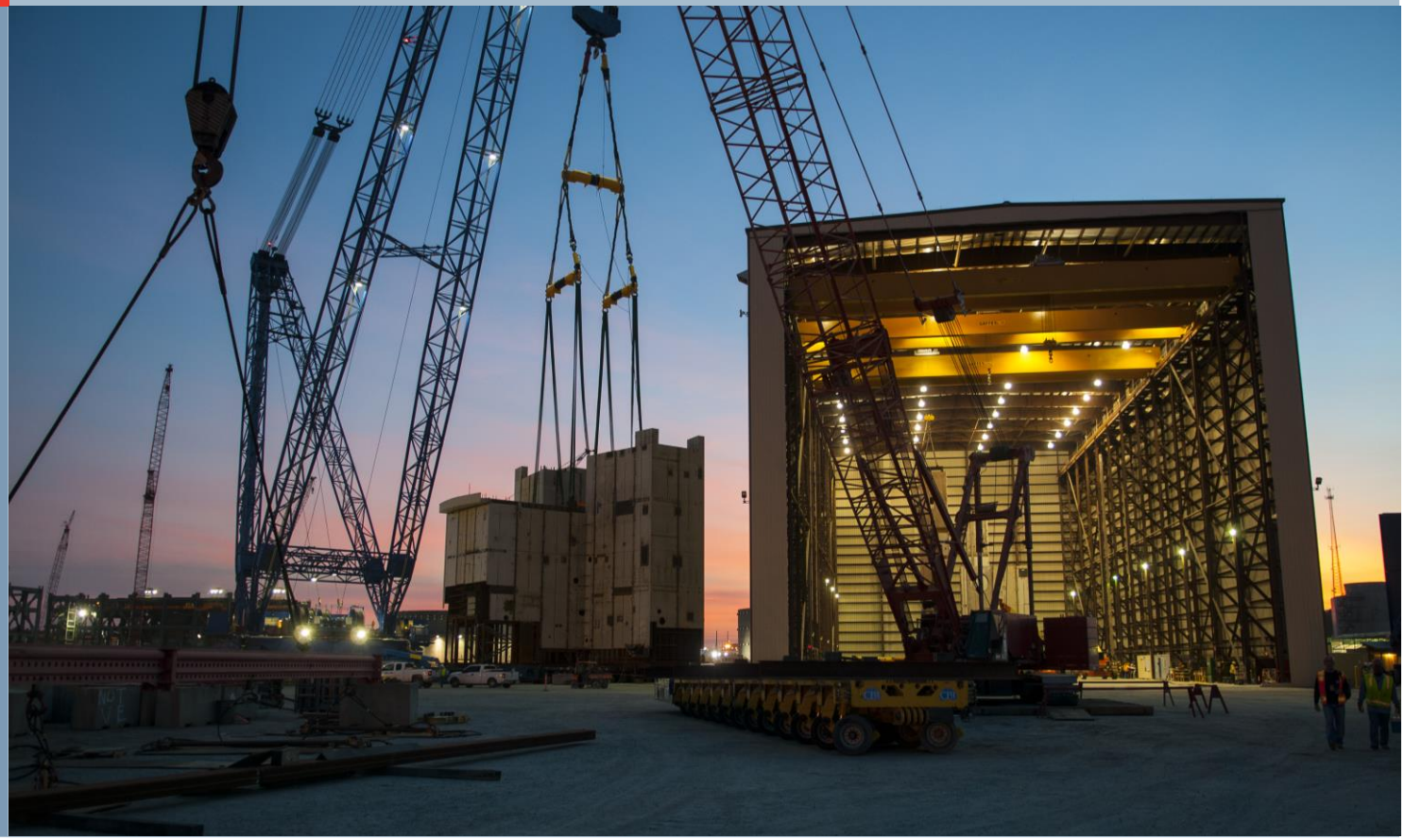
V.C. Summer Nuclear Generating Station Units 2 & 3

Preliminary Results of Bechtel Assessment

October 22, 2015 Presentation to SCE&G and Santee Cooper

INFRASTRUCTURE
MINING & METALS
NUCLEAR, SECURITY & ENVIRONMENTAL
OIL, GAS & CHEMICALS



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Agenda

- Overview
- Introduction
- Assessment Timeline
- Assessment Scope
- Bechtel Assessment Team
- Project Management
- Engineering & Licensing
- Procurement
- Construction
- Start-Up
- Project Controls
  - Schedule Assessment
- Preliminary Conclusions

Overview

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- The objective of the assessment was to assist the Owners to better understand the current status and potential challenges of the project and to help ensure the project is on the most cost efficient trajectory to completion.
- Based on our assessment, the current schedule is at risk. Significant issues include:
  - To-go scope quantities, installation rates, productivity, and staffing levels all point to completion later than current forecast.
  - While EPC plans and schedules are integrated; the plans and schedules are not reflective of actual project circumstances.
  - The Consortium lacks project management integration needed for EPC.
  - There is a lack of a shared vision, goals, and accountability between the Owners and the Consortium.
  - The WEC-CB&I relationship is extremely poor, caused to a large extent by commercial issues.
  - The Contract does not appear to be serving the Owners or the Consortium particularly well.
  - The issued design is often not constructible resulting in a significant number of changes.
- The oversight approach taken by the Owners does not allow for real-time, appropriate cost and schedule mitigation.

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Introduction

- The assessment was performed in accordance with an August 6, 2015 Professional Services Agreement between Bechtel Power Corporation and Smith, Currie & Hancock LLP (SCH) for the purpose of assisting SCH in giving legal advice.
- The objective of the assessment was to assist SCH and the Owners (South Carolina Electric & Gas Company and South Carolina Public Service Authority) to better understand the current status and potential challenges of the project in anticipation of litigation and also to help ensure the project is on the most cost efficient trajectory to completion.
- Bechtel's team evaluated the current status and forecasted completion plan through the design, supply chain, and construction aspects of the project.
  - Focus was on understanding the issues that have caused impacts to date, assessing the effectiveness of the mitigation plans put into place to address those issues, and reviewing the project management tools and work processes being employed to plan and execute the project, including change management, through completion and turnover of the units.
- Materials received, collected or prepared by Bechtel in connection with the assessment are the property of the Owners and shall be treated as confidential.

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Assessment Timeline

- Schedule:
  - Issue draft report 7 weeks following site mobilization for Owners' review.
- The assessment included:
  - Data validation
  - Site walkdowns
  - Leadership team interviews
  - Functional breakout sessions
  - Preparation of report
- Key dates:
  - August 14: Initial documents received from Consortium
  - August 19: Portions of Integrated Project Schedule received
  - September 8: Bechtel Team mobilized to site
  - September 9: Consortium presentation to Bechtel Team
  - October 22: Bechtel presentation to SCE&G and Santee Cooper

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Assessment Scope

- During the assessment period, the Bechtel team:
  - Reviewed 353 Consortium and Owner documents.
  - Attended 70 meetings with Consortium and Owner personnel.
  - Conducted 35 interviews of Consortium and Owner personnel.
  - Completed 24 site walkdowns/real-time observations.
  - Attended 7 subject-specific presentations.
- Bechtel's assessment is based on the data, schedule, and other information obtained from the Consortium and the Owners:
  - Construction bulk quantities were obtained from the Consortium (various questions on these quantities were identified).
  - Some data and information was provided electronically by the Owners and the Consortium. For the majority of data and information, a single hard copy was placed in a Reading Room at the site and no additional copies could be made. This limited our ability to fully assess the information [e.g., engineering schedules, ROYG (red-orange-yellow-green) report, etc.]
  - Many documents were redacted.
- Only key observations are identified in this presentation. Additional observations will be included in the final report.

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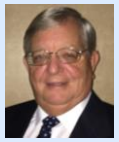
Bechtel Assessment Team

	**Carl Rau** Executive Sponsor		**Dick Miller** Assessment Team Leader
	**Ty Troutman** Principal Vice President Assessment Reviewer		**John Atwell** Principal Vice President Assessment Reviewer
	**George Spindle** Construction		**Mike Robinson** Construction
	**Ed Sherow** Engineering and Licensing		**Ron Beck** Engineering and Construction
	**Steve Routh** Engineering and Licensing		**Bob Exton** Procurement & Contracts
	**Jason Moore** Project Controls		**Jonathan Burstein** Project Controls
	**Bob Pedigo** Startup		**Jerry Pettis** Project Administration

- 14 senior managers supported by Bechtel functional departments
- Over 500 years of total experience
- Over 300 years of EPC nuclear experience
- Experience on over 85 EPC projects

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Project Management
Key Observations and Recommendations

- The Consortium's project management approach does not provide appropriate visibility and accuracy to the Owners on project progress and performance.
- There is a lack of accountability in various Owner and Consortium departments.
- The Consortium's lack of project management integration (e.g., resolution of EPC issues) is a significant reason for the current construction installation issues and project schedule delays.
- The approach taken by the Owners does not allow for real-time, appropriate cost and schedule mitigation.

Recommendation:

» Owner: Develop an Owners' Project Management Organization and staff it with EPC-experienced personnel who are empowered with the roles, responsibilities, and accountabilities for making the needed project-related decisions to keep the project on track.

» Consortium: Assign recognized high-performing personnel to the current Consortium management personnel (i.e., shadow positions) as part of a major improvement plan.

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Project Management

Key Observations and Recommendations (cont'd)

- The WEC-CB&I relationship is extremely poor, caused to a large extent by commercial issues.

  Recommendation: The Owners should take an active role in determining the reason(s) for the relationship and develop an action plan, including possible new contract terms, to fix the relationship.

- The overall morale on the project is low.

  Recommendation:
  - » The Project needs to experience some successes, no matter how small. Publish and post scheduled activities for the coming months around the job site. Post activities that have a high likelihood of being completed within schedule. Reward those responsible for achieving success (i.e., make success contagious).
  - » Recognize individuals for their contributions to the project. For example, have an employee of the month from the various functions/various craft trades and publicly reward them. Rewards could include preferred parking for a month, gift certificates, etc.

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Project Management

Key Observations and Recommendations (cont'd)

- It appears that the Contract has created an imbalance between the Owners and the Consortium. The Consortium does not appear to be commercially motivated to meet Owner goals.
- WEC Engineering has not been completely responsive to Procurement and Construction requests for clarification and changes (e.g., timeliness, constructible designs); this is believed to be caused mostly by the commercial situation (i.e., WEC fixed price engineering).
- The Consortium's commercial structure, while not shared, is outwardly affecting the day-to-day working relationships between the Consortium partners and is creating performance issues, including significant non-manual turnover.

Recommendation:

» Align commercial conditions with the project goals.

» Facilitate Owner and Consortium teambuilding. If necessary, replace personnel with others that share the goals developed by the project.

» Determine the realistic to-go forecast costs for the project.

Engineering & Licensing
Key Observations and Recommendations

- Based on the team's observation of current civil work, the issued design is often not constructible (currently averaging over 600 changes per month). The complexity of the engineering design has resulted in a significant number of changes to make the design constructible.

  Recommendation:
  - » Locate dedicated WEC engineering response teams to the site with design authority to resolve current Engineering & Design Coordination Reports (E&DCR) problems.
  - » Establish a WEC/CB&I "Light Structures" design organization at the site to work with construction to redesign and reissue piping, HVAC, conduit, and tray supports.

- The construction planning and constructability review efforts are not far enough out in front of the construction effort to minimize impacts.

  Recommendation: Intensify efforts of Strategic Planning Group, work package planning, constructability reviews, etc. to early identify design changes needed.

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Engineering & Licensing

Key Observations and Recommendations *(cont'd)*

- Resolution of many E&DCRs is behind schedule. The E&DCR backlog is not decreasing.

  Recommendation: Provide additional staffing to address emergent E&DCRs and work off current backlog. Locate more appropriate resources to the site to address early any emergent E&DCRs.

- Engineering staffing remains extremely high (around 800 total engineers for WEC and CB&I) for the reported percent complete of the design; however, it appears that the staffing is needed to complete the design and provide support to construction.

  Recommendation:
  - » Allocate dedicated resources to complete and issue the remaining design on or ahead of current schedule which is ≈ the end of 2016.
  - » Plan to reduce engineering headcount and aggressively monitor.

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Engineering & Licensing
Key Observations and Recommendations *(cont'd)*

- There is significant engineering and licensing workload remaining for electrical design, I&C, Post-Design Engineering Closure Plan, ITAAC closure, etc. Much of this remaining engineering will potentially impact construction.

  Recommendation:
  - » Allocate dedicated resources to complete and issue the remaining design on or ahead of the current schedule which is approximately the end of 2016.
  - » Convene a group of SMEs and commit to completing the scoping, resource loading, and scheduling of Post-Design Engineering Closure Plan work by no later than 1Q2016.

- 119 license amendment requests (LARs) and 657 departures have been identified to date. This is a significant project workload that appears to be well planned and scheduled. Interactions with the NRC are good with a focus on meeting construction need dates (CNDs). Emergent issues potentially requiring NRC approval of LARs remain a significant project concern.

  Recommendation: Continue planning and scheduling efforts for LARs and departures and active interactions with NRC to meet CNDs. Intensify efforts of Strategic Planning Group, work package planning, constructability reviews, etc. to emphasize early identification of potential departures.

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Procurement

Key Observations and Recommendations

- There is a significant disconnect between construction need dates and procurement delivery dates. There are:
  - 457 open WEC and 2,907 open CB&I equipment deliveries.
  - 31 WEC and 28 CB&I Standard Plant POs to be placed.
- The ROYG (red-orange-yellow-green) report is described as inaccurate.

  Recommendation:
  - The Consortium should complete their schedule adherence effort by 10/31/15 so that mitigation plans can be implemented, resulting in the ROYG report properly addressing CNDs, PO awards, and supplier deliveries.
  - Assess resource needs to properly manage this activity.
- The amount of stored material onsite is significant, creating the need for an extended storage and maintenance program. Inventory validation in the yard is reported to be only at 48% accuracy.

  Recommendation: Investigate and determine if component and material deliveries can be delayed for shipment (i.e., delay fabrication and delivery to minimize onsite storage durations) in order to minimize the need to perform extended period PM and storage actions on site. Implement every opportunity to minimize onsite storage duration after initial delivery.

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Procurement

Key Observations and Recommendations *(cont'd)*

- The current Min/Max warehousing program is insufficient for the scale of the construction effort, which is impacting productivity.

  Recommendation:

  - » Expedite the finalization of the Min/Max strategy and implementation of the identified Blanket Purchase Orders (BPOs) so that construction can use them, versus writing individual material requisitions.
  - » In reviewing the report of BPOs in place that would support a Min/Max system, there must be further discussion with construction and field engineering as to what products should be maintained within the Min/Max system.
  - » Educate site personnel on the use and process of the BPOs and the Min/Max system. It was evident that material was ordered versus use of Min/Max – BPOs.

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Construction

Key Observations and Recommendations

- Construction productivity is poor: Unit 2 is 2.3, Unit 3 is 1.6.

  Recommendation:
  - » Achieve more timely resolution of engineering issues.
  - » Assemble a team of subject matter experts to review proposed resolutions.
  - » Re-assess tolerances and repair procedures to give construction more latitude in resolving issues.
  - » Simplify the work packaging process (see next slide).
  - » Efforts need to be made to keep the craft at the workface (have coffee breaks and lunch at their place of work).

- Manual and non-manual sustained overtime is negatively affecting productivity.

  Recommendation:
  - » The work week should be reduced to no more than 48 hours (four 10 hour days, one 8 hour day). Spot overtime beyond 48 hours should be kept to a minimum.
  - » Consider craft incentive plan.

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Construction

Key Observations and Recommendations *(cont'd)*

- CB&I's work packaging procedures are overly complex and inefficient, directly affecting craft productivity.

  Recommendation:
  - » Simplify the process.
  - » Reduce the scope of the package.
  - » Limit the foreman's package to only the information needed.
  - » Incorporate changes into the design drawings before work begins.

- Aging of the construction workforce is impacting productivity.

  Recommendation:
  - » Develop mentoring and training plan to promote junior craft and field engineering personnel with periodic evaluations and feedback sessions.
  - » Create and staff shadow positions for senior level positions within the Consortium intent on developing new talent that is focused on project completion.

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Construction

Key Observations and Recommendations *(cont'd)*

- The indirect to direct craft ratio (1,100 persons to 800 persons) is very high at 130% (typical mega-project is 35 to 40%).

  Recommendation: Develop a plan to identify targeted reductions to reduce the indirect ratio to a reasonable level and monitor it weekly.

- Field non-manual turnover is high at 17.4% per annum.

  Recommendation: Perform evaluation of high turnover rate to correct the problem.

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Construction

Key Observations and Recommendations *(cont'd)*

- The workable backlog can support significantly more than the current craft workforce. The current construction percent complete per month is only 0.5%.

  Recommendation:
  - » Staff up to work available areas.
  - » Increase the amount of time the craft are at the workface. Perform time and motion study.
  - » Consider combining the Unit 2 and 3 Nuclear Island teams to reduce non-manual staffing and allow flexibility when issues are encountered.
  - » Use the onsite training facility and local vocational schools to train more crafts that can't be recruited (rebar ironworkers now; pipefitters and electricians in the future).

- The project safety, housekeeping, and quality records are very good.

  Recommendation: Keep up the good work! Consider simplifying the tailgate write-up so it can be more easily understood and retained. Reconsider need for each craftsman to sign the morning bulletin.

Start-Up

Key Observations and Recommendations

- The startup test program schedule is in the early stages of development.

  Recommendation: Expedite the effort to reconcile the Component Test and Pre-Operational Test system templates currently loaded in the project schedule to the actual systems' scope and estimated unit rates. Completing this activity is critical to having a reasonable understanding of the overall project completion schedule.

- The current boundary identification package (BIP) turnover rate appears to be overly aggressive and not consistent with the current construction completion schedule.

  Recommendation: Reconcile the timing of BIP turnovers to the planned construction percent complete dates. This will impact when Component Testing and Pre-Operational testing activities will occur, thus driving the project completion schedule.

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Project Controls
Key Observations and Recommendations

- The Consortium's forecasts for schedule durations, productivity, forecasted manpower peaks, and percent complete do not have a firm basis.

  Recommendation: See Schedule Assessment (starts on next slide).

- The Owners do not have an appropriate project controls team to assess/validate Consortium reported progress and performance.

  Recommendation: Form Owners' Project Controls team (Project Controls Manager, Lead Planner, Lead Cost). Establish tracking tools separate from the Consortium for verification of project progress and performance. Require the appropriate level of detailed information from the Consortium.

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Schedule Assessment

Key Bases

- Data from 21 completed nuclear units and 4 units in the planning phase was used.
- Civil/steel activities:
  - Walked down and assessed based on current progress and performance.
- Bulk commodities and major equipment:
  - Logic and installations derived from Bechtel historical data.
  - Median sustained rates from Bechtel historical data used for creation of installation durations.
- Craft:
  - Peak craft limited by building saturation levels.
  - All activities worked on a 48 hour week; second shift at 20%.
  - Indirect to direct craft ratio is 35% (currently 130%).
- Stagger between Unit 2 and Unit 3 commercial operation dates:
  - Based on critical craft peaks (pipefitters including welders & electricians).

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Schedule Assessment
Key Assumptions

- Current civil progress and performance will remain unchanged.
- Piping and electrical progress and performance is based on similar Bechtel experience.
- Sufficient quality craft is available up to 3,700 peak.
- All modules and material will be available to support the assessed construction dates.
- Preventive maintenance keeps all equipment operationally ready.
- Quantities provided by the Consortium were used and are accurate:
  - Exception: The annex building quantities are considered unreliable, hence schedule extension due to higher than expected quantities in this area not included.
- No construction equipment limitations.
- Design and work packages are available to support construction need dates.
- The following items do not enter the critical path:
  - NRC approval of license amendment requests
  - ITAAC closures
  - Cyber security
  - Simulator construction and operator qualifications

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Schedule Assessment
Preliminary Results

- Preliminary assessment of the Unit 2 and 3 Commercial Operation Dates based on the Key Bases and Assumptions stated above:

	Unit 2	Unit 3
Current COD	June 2019	June 2020
Adjustment	18 to 26 months	24 to 36 months
New COD	Dec 2020 to Aug 2021	June 2022 to June 2023

- The critical path will change from the shield wall to more typical bulk installations through overall project checkout and testing/start-up.
- Increasing schedule confidence to 75% increases the schedule duration by 8 months (included in the 26 months for Unit 2 and the 36 months for Unit 3).
- The stagger between the Unit 2 and 3 CODs extends by 6 months to 18 months.
- The peak monthly construction percent complete is reduced from 3.1% to 2.3%.
- Primary checkout window adjusts by 6 months to 18 months per unit.
- Total craft population increases by 25% to ~3,700.
  - At peak, 850 pipefitters and 730 electricians are required.
- Bulk installation durations increased by a minimum of 30%.

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Schedule Assessment
Preliminary Results *(cont'd)*

- Schedule Probability Assessment:
  - Only performed on critical path and top 4 near critical paths because of time limitations.
  - Typical 1,000 iteration Monte Carlo approach.
  - Minimum/maximum windows provided by senior construction personnel on assessment team.
  - Minimum/maximum historical bulk installation rates used as secondary verification method.
  - Only preferential logic considered.
  - Identification of required contingency for assessment purposes only.
  - A more robust approach is needed prior to finalization of any changes to the baseline target schedule.

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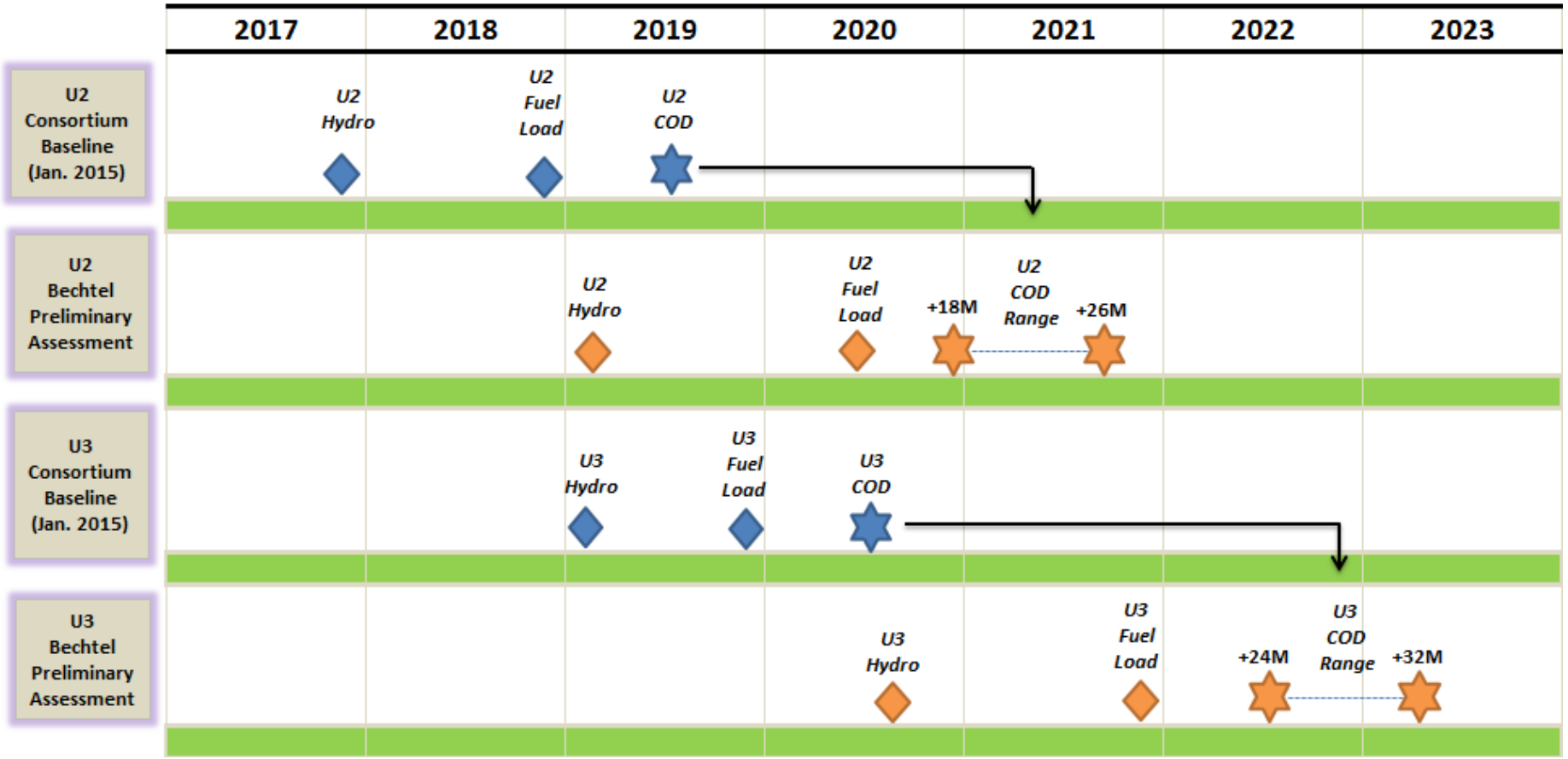
Schedule Assessment
Milestone Comparison



Preliminary Results of Bechtel Assessment

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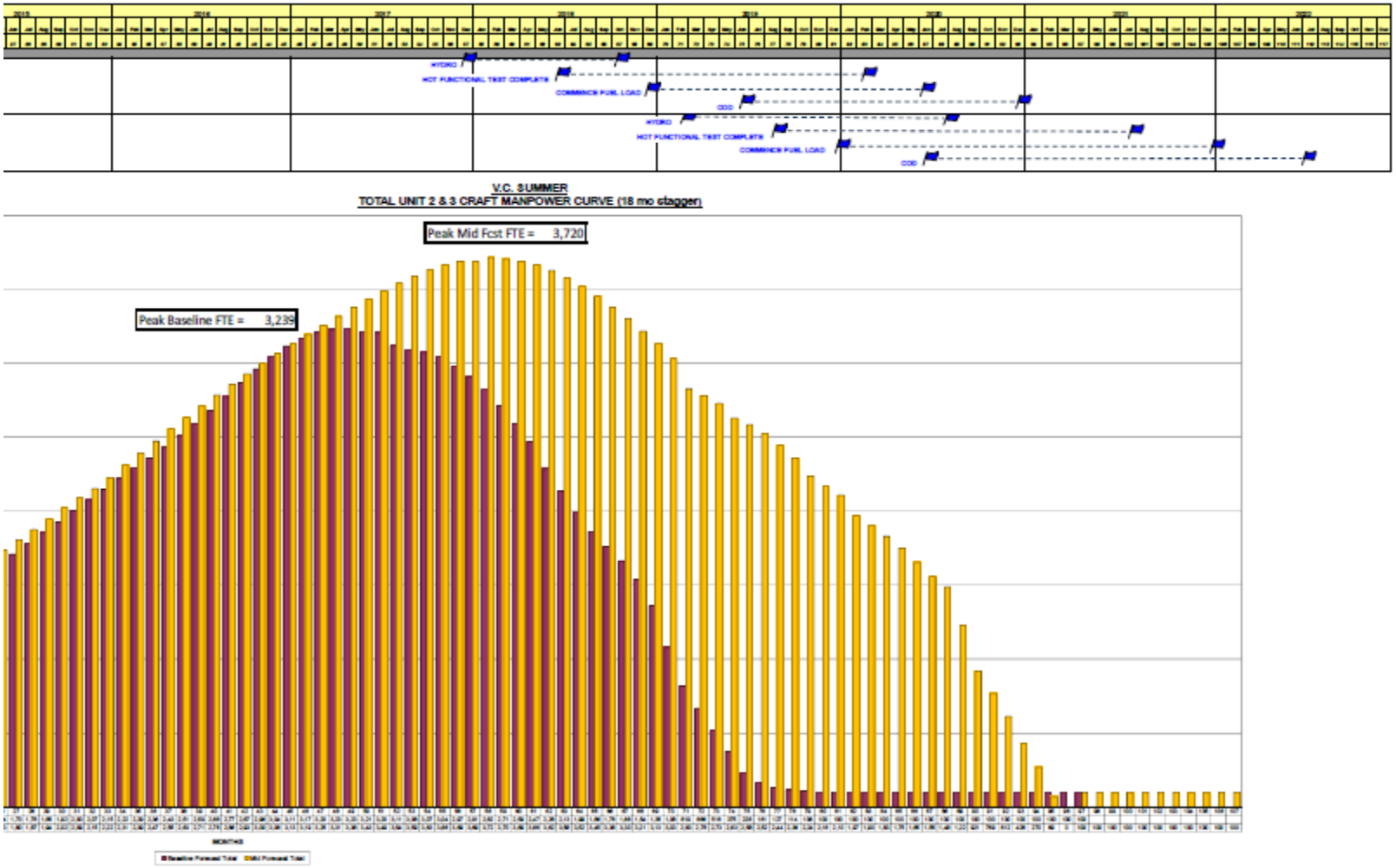
Schedule Assessment

Total Craft Manpower Comparison



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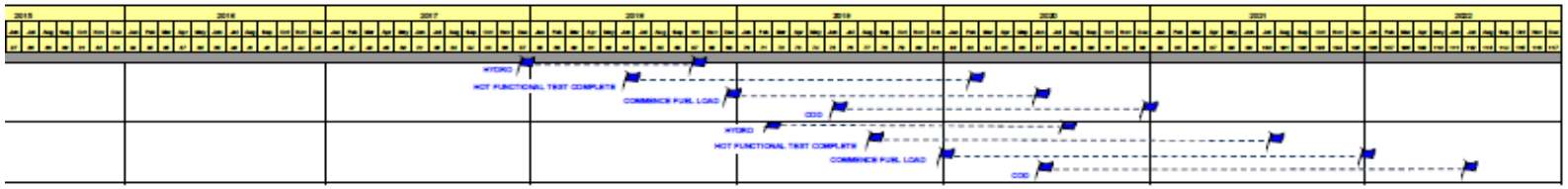
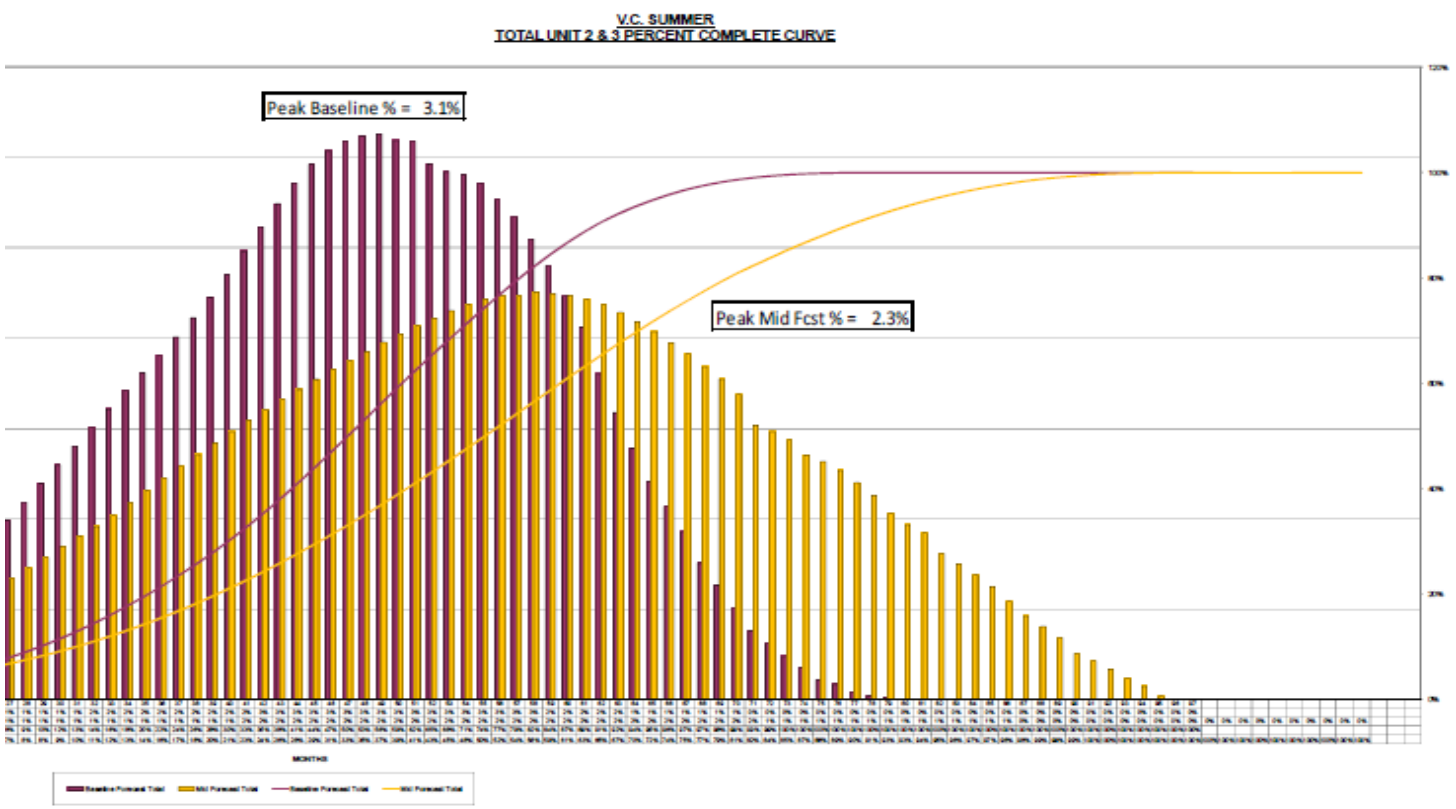
Schedule Assessment

Construction Percent Complete Comparison





Preliminary Conclusions

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- The AP1000 is a first-of-a-kind technology, 10 CFR 52 is a new licensing process, and these are the first new nuclear plants being constructed in the U.S. in decades. Challenges would be expected.
- However, the V.C. Summer Units 2 and 3 project suffers from various fundamental EPC and major project management issues that must be resolved for project success:
  - The Consortium's project management approach does not provide appropriate visibility and accuracy to the Owners on project progress and performance.
  - The Consortium's forecasts for schedule durations, productivity, forecasted manpower peaks, and percent complete do not have a firm basis. Bechtel's preliminary assessment of the Unit 2 and 3 Commercial Operation Dates indicates:

	Unit 2	Unit 3
Current COD	June 2019	June 2020
Adjustment	18 to 26 months	24 to 36 months
New COD	Dec 2020 to Aug 2021	June 2022 to June 2023

Preliminary Conclusions *(cont'd)*

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- There is a lack of a shared vision, goals, and accountability between the Owners and the Consortium.
- The Consortium lacks project management integration needed for EPC.
- The WEC-CB&I relationship is extremely poor, caused to a large extent by commercial issues.
- The overall morale on the project is low.
- The Contract does not appear to be serving the Owners or the Consortium particularly well.
- The issued design is often not constructible resulting in a significant number of changes. The construction planning and constructability review efforts are not far enough out in front of the construction effort to minimize impacts.
- There is significant engineering and licensing workload remaining (currently over 800 engineers). ITAAC closure will be a significant effort.
- Emergent issues potentially requiring NRC approval of LARs remain a significant project concern.
- There is a significant disconnect between construction need dates and procurement delivery dates.
- The amount of stored material onsite is significant, creating the need for an extended storage and maintenance program.

Preliminary Conclusions *(cont'd)*

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- Construction productivity is poor for various reasons including changes needed to the design, sustained overtime, complicated work packages, aging workforce, etc.
- The indirect to direct craft ratio is very high.
- Field non-manual turnover is high.
- The schedule for the startup test program is in the early stages of development. The BIP turnover rate appears to be overly aggressive.
- The Owners do not have an appropriate project controls team to assess/validate Consortium reported progress and performance.

Mtg w/ Bechtel
7/13/15

CRAIG Albert — MIKE Adams — CARL Rau

** Need agreements / NDA's ASAP
Need before 7/28 Kickoff

** ☐ 7/31 Conf call - status

Weekly status reports

5) May be light at top. ~~IBB~~ Steve/Jeff/Ron ?

Should Jeff Archie be 100% project?

8) 588 Bechtel personnel ramp up,
in September [illegible] Bar - Option [illegible]

From: Pelcher, Steve(stephen.pelcher@santeecooper.com)
To: BYNUM, ALVIS J JR
CC:
BCC:
Subject: RE: Owners' NDA with Bechtal
Sent: 05/20/2015 01:31:12 PM -0400 (EDT)
Attachments:

***This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source.

Al: Having quickly looked it over again, I agree that Bechtal would have executed the form of Propriety Data Agreement described in Exhibit O-1 of the EPC.
I think we have to assume that any report prepared would be discoverable if we wind up in litigation.
Thanks.
Steve

From: BYNUM, ALVIS J JR [mailto:ABYNUM@scana.com]
Sent: Wednesday, May 20, 2015 1:22 PM
To: Pelcher, Steve
Subject: RE: Owners' NDA with Bechtal
Steve
I got the proposal by internal mail yesterday. Don't recall discussing it. It seems like to me, we would have to have them sign that Proprietary Data Agreement that is exhibit O-1 to the EPC
Do you know if this report will be discoverable if we wind up in litigation?
Al

From: Pelcher, Steve [mailto:stephen.pelcher@santeecooper.com]
Sent: Wednesday, May 20, 2015 12:13 PM
To: BYNUM, ALVIS J JR
Subject: Owners' NDA with Bechtal
***This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source.

Al: I hope you are doing well and looking forward to the Memorial Day Weekend.
I was chatting with Michael Crosby yesterday afternoon about a variety of things, and Michael mentioned that Steve Byrne had or would be speaking with you about drafting a Non-Disclosure Agreement between the Owners and Bechtal Engineering that would allow Bechtal to begin looking at project documents. I am writing just to see whether you and Byrne had an opportunity to speak about this matter, or whether you had thought deeply about the legal issues or process moving forward. I understand second hand that Lonnie and Kevin are very interested in getting Bechtal plugged into this process.
On a separate matter, I wonder whether you had received any feedback on the trip our respective principals had taken to China and Japan a couple weeks back?
Thanks.
Steve

If you have questions, please call the IT Support Center at Ext. 7777.
****

From: ARCHIE, JEFFREY B(/O=SCANA/OU=COLUMBIA/CN=RECIPIENTS/CN=JARCHIE)
To: BYRNE, STEPHEN A
CC:
BCC:
Subject: Video Conference
Sent: 07/16/2015 08:19:00 AM -0400 (EDT)
Attachments:

Spoke to Crosby this morning. He is going to call in with his legal and participate in our discussion with the consortium tomorrow. Also he is softening on the
George Wenick issue. We need to consider if focusing on precluding discovery by SNC needs to be more of a driver for engaging Wenick as we continue to discuss it with Santee. Precluding complications with the litigation with SNC is something that the consortium is very interested in and it resonates with Mike.

Sent from my BlackBerry 10 smartphone on the Verizon Wireless 4G LTE network.

From: Pelcher, Steve(stephen.pelcher@santeecooper.com)
To: BYNUM, ALVIS J JR
CC:
BCC:
Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3
Sent: 06/29/2015 01:37:00 PM -0400 (EDT)
Attachments:

***This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source.

Al: As I shared with you, I was not part of the super-secret conversation that Lonnie and Kevin (with Steve Byrne present) had with Danny Roderick. I have not been read into those conversation.
What little I know about this is that Bechtel is now being viewed as a joint resource to put the project on track, rather than an Owners resource only. This is obviously a shift in how we originally intended to use Bechtel.
You might want to chat with Steve Byrne or Kevin and get their direction on this, possibly before getting back to Martyn. (I wonder if Craig Albert has circled back to Martyn yet, including on the upcoming July 1st meeting?)
Thanks.
Steve

From: BYNUM, ALVIS J JR [mailto:ABYNUM@scana.com]
Sent: Monday, June 29, 2015 1:11 PM
To: Pelcher, Steve
Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3
Steve
The materials that we got from WEC concern me. Why are they involving them? Some of the restrictions, etc. seem problematic to me. I must be missing something
Al

From: Pelcher, Steve [mailto:stephen.pelcher@santeecooper.com]
Sent: Monday, June 29, 2015 1:09 PM
To: Daw, Martyn
Cc: BYNUM, ALVIS J JR
Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3
***This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source.

Martyn: I will defer to Al Bynum on suggesting a time for such a conversation.
Thanks.
Steve

From: Daw, Martyn [mailto:mndaw@bechtel.com]
Sent: Monday, June 29, 2015 12:13 PM
To: BYNUM, ALVIS J JR; Pelcher, Steve
Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3
Al/Steve - please can you let me know a good time for us to speak
Thanks
Martyn

From: Daw, Martyn
Sent: Wednesday, June 24, 2015 7:32 AM
To: 'BYNUM, ALVIS J JR'; 'Pelcher, Steve'
Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3 [*EXTERNAL*]
Al/Steve - my business folk have requested an update as to the plan for getting the Purchase Order/contract in place.

I'm currently in the UK on business but can be available for a call at your convenience.
Please let me know
Thanks
Martyn

From: Daw, Martyn
Sent: Saturday, June 20, 2015 10:02 AM
To: 'BYNUM, ALVIS J JR'; 'Pelcher, Steve'
Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3 [*EXTERNAL*]
Hi Al and Steve (and welcome back to Al from his trip to Asia)
I understand the green light has been given for the assessment. Shall we have a chat early next week about getting the Purchase Order/contract in place? We discussed previously that it would make sense just to use the terms of one of the existing contracts between SCE&G and Bechtel. We can be flexible on this.
It would be good to get the PO/contract in place before the kick-off meeting which I think is planned for July 1.
Thanks and look forward to hearing from you
Martyn

From: Daw, Martyn
Sent: Monday, June 01, 2015 6:42 PM
To: 'BYNUM, ALVIS J JR'; Pelcher, Steve
Cc: Cherry, Marion; Crosby, Michael; LINDSAY, RONALD; BYRNE, STEPHEN A; Albert, Craig
Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3 [*EXTERNAL*]
Thanks very much, Al
Martyn

From: BYNUM, ALVIS J JR [mailto:ABYNUM@scana.com]
Sent: Monday, June 01, 2015 1:28 PM
To: Daw, Martyn; Pelcher, Steve
Cc: Cherry, Marion; Crosby, Michael; LINDSAY, RONALD; BYRNE, STEPHEN A; Albert, Craig
Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3 [*EXTERNAL*]
Here is the signed O-1

From: Daw, Martyn [mailto:mndaw@bechtel.com]
Sent: Monday, June 01, 2015 1:10 PM
To: Pelcher, Steve; BYNUM, ALVIS J JR
Cc: Cherry, Marion; Crosby, Michael; LINDSAY, RONALD; BYRNE, STEPHEN A; Albert, Craig
Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3
***This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source.

Steve - thanks again to you and Al for the call this morning.
Attached is a pdf of the Proprietary Data Agreement signed by Bechtel Power Corporation. Please can Al or you let me know if you'd like me to send along the original with the wet signature.
I look forward to hearing from you/Al as to the path forward with respect to getting a PO in place. As I indicated on the phone, we are flexible on this and we are willing to be retained by your outside counsel if you believe that would be preferable.
On the documents side, I believe that Dick Miller will be point of contact for Bechtel but I am confirming this as I write.
Thanks again for the discussion this morning
Martyn

From: Pelcher, Steve [mailto:stephen.pelcher@santeecooper.com]
Sent: Monday, June 01, 2015 12:04 PM
To: Daw, Martyn; Bynum, Alvis
Cc: Cherry, Marion; Crosby, Michael; Lindsay, Ronald ; Byrne, Stephen A.; Albert, Craig
Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3 [*EXTERNAL*]

Martyn/Al: It was great speaking with you this morning.
As a follow up to our conversation, I believe that the very first action item will be for Bechtel to send a partially executed copy of the Proprietary Data Agreement to Al Bynum for the Owner's countersignature. Please keep Santee Cooper in the loop so that Santee Cooper might have a fully executed copy of that agreement for our records.
Next up, regarding the documents that Bechtel will review as part of its assessment, Marion Cherry of Santee Cooper has been working with somebody at SCE&G in assembling the documents that will be reviewed. I have copied Marion on this Email. (Marion: Who have you been working with at SCE&G on assembling these documents?) My notes indicate that the Bechtel guy who will likely be the logistical link in receiving these documents is 'Dick Miller' but I may be mistaken about this. Note to Al: As a process point, we need to make sure anything that we share with Bechtel fits within the definition of "Contractor Discloseable Information" as that is defined in Section 19.3(b) of the EPC.
During the call, we discussed the possibility that Bechtel might be retained by George Wenick (Smith, Currie & Hancock LLC), if there is an advantage in doing so. Al Bynum will have a conversation with George about that later today, so that we might close that loop on that possibility.
Al mentioned that he will begin his annual vacation this Thursday, although that we should contact his boss, Ron Lindsay, should something come up while he is away.
Finally, we concluded our conversation with a discussion of the form of the Purchase Order the Owners would use to retain Bechtel (assuming Bechtel isn't retain by Smith Currie.) A suggestion was made that we might "re-purpose" an existing PO the Owners have Bechtel to provide licensing and engineering support. Al identified Kyle Nash as the guy at SCE&G would likely process this paperwork.
Thanks again for the good conversation.
Let's stay in touch.
Steve

-----Original Appointment-----
From: Pelcher, Steve
Sent: Monday, June 01, 2015 9:28 AM
To: Pelcher, Steve; Daw, Martyn ; Bynum, Alvis
Subject: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3
When: Monday, June 01, 2015 11:00 AM-11:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: Dial-in Number: (877)635-0568; Participant Code: 8437614016
Date of Call: June 1, 2015
Time of Call: 11:00AM
Duration of Call: 30 Minutes
Dial-in Number: (877)635-0568
Participant Code: 8437614016
Discuss:

- Process for execution of "Proprietary Data Agreement."
- Process of jump starting Bechtel's review of documents consistent with Proprietary Data Agreement and Section 19.3 of the EPC.
- Process of Owners executing a PO with Bechtel.

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****

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****

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From: Wenick, George(/o=Smith, Currie and Hancock/ou=SCH/cn=Recipients/cn=gdw)
To: 'BYNUM, ALVIS J JR'
CC: LINDSAY, RONALD
BCC:
Subject: RE: Message from "RNP0026738D1D5A"
Sent: 05/22/2015 02:00:00 AM -0400 (EDT)
Attachments:

Al,

I am in favor of hiring Bechtel, but have two problems with certain statements on page 1 of the Assessment Proposal. Those statements are, as follows:

"There will be focus on understanding the issues that have caused impacts to date, assessing the effectiveness of the mitigation plans put into place to address those issues, and reviewing the project management tools and work processes being employed to plan and execute the project, including change management, through completion and turnover of the units. For clarity this team will not evaluate the ownership of past impacts or validity of pending or future claims."

First, I have trouble seeing how Bechtel could come to understand "the issues that have caused impacts to date" without evaluating "the ownership of past impacts." That seems illogical.

Second, and more important, we need to prevent Bechtel's product from being discoverable. To do that, we need to establish that we are hiring Bechtel "in anticipation of litigation or to prepare for trial." We will likely not be able to do so, if Bechtel "will not evaluate the ownership of past impacts or validity of pending or future claims."

George

-----Original Message-----
From: BYNUM, ALVIS J JR [mailto:ABYNUM@scana.com]
Sent: Wednesday, May 20, 2015 8:54 AM
To: Wenick, George
Cc: LINDSAY, RONALD
Subject: FW: Message from "RNP0026738D1D5A"

George - Santee Cooper wants to hire Bechtel pursuant to the attached proposal (I didn't see the pages that aren't specific to the engagement). I'm curious if you see any problems from this - are we just creating discoverable material?

Thanks - Al

-----Original Message-----
From: ricohdevice@scana.com [mailto:ricohdevice@scana.com]
Sent: Wednesday, May 20, 2015 8:45 AM
To: BYNUM, ALVIS J JR
Subject: Message from "RNP0026738D1D5A"

This E-mail was sent from "RNP0026738D1D5A" (Aficio MP 7502).

Scan Date: 05.20.2015 08:44:47 (-0400)
Queries to: ricohdevice@scana.com

PROFESSIONAL SERVICES AGREEMENT

This Professional Services Agreement ("Agreement") is by and between Bechtel Power Corporation ("Bechtel") and Smith, Currie & Hancock LLP ("SCH"), in connection with the construction of improvements at the V.C. Summer Nuclear Station ("Project"), pursuant to an EPC Agreement dated March 23, 2008 between South Carolina Electric & Gas Company, for its self and as agent for South Carolina Public Service Authority, (jointly referred to as the "Owner"), and a consortium consisting of Westinghouse Electric Company LLC and CB&I Stone & Webster, Inc. (jointly referred to as the "Consortium").

AGREEMENT TERMS AND CONDITIONS

1. Bechtel agrees to provide professional consulting services to SCH in connection with SCH's representation of Owner concerning the Project. The services to be rendered under this Agreement (the "Services") are described on Attachment A to this Agreement. Bechtel will perform the Services with approximately ten senior managers and anticipates completing the Services in approximately eight weeks.

2. SCH agrees to the following terms of compensation for Bechtel's Services:

- Bechtel will be compensated a fixed lump sum fee of $1 million ("Fee"), which includes all fees, expenses, taxes, insurance, and all other costs.
- 25% of the Fee will be paid by SCH within seven (7) days after the signing of this Agreement, with the balance of the Fee due from SCH upon delivery of the report and recommendations and completion of the Services.

3. All communications related to the Services between Bechtel or any attorney, agent or employee of Bechtel, on the one hand, and any attorney, agent, or employee of SCH or Owner, on the other hand, shall be regarded as confidential and made solely for the purpose of assisting SCH in giving legal advice to Owner. Bechtel shall not disclose to anyone, without written permission from SCH, the nature or content of any such oral or written communication.

4. Bechtel will treat as confidential all work papers, records, samples, or other documents or materials (including computer files of any type) received, collected, or prepared in connection with this Agreement regardless of their nature or whether they were created by Bechtel or others

("Confidential Material"). All Confidential Material will be the property of Owner and will be subject to the unqualified right of Owner's attorneys, SCH, to instruct Bechtel with regard to the possession and control of such Confidential Material, provided that Bechtel will be entitled to retain one archival copy of its own work product for record retention purposes, such copy to be maintained securely and subject to the terms of this Agreement.

No obligation of confidentiality shall apply to any information or material which is:

a) now generally known or readily available to the trade or public or which becomes so known or readily available without fault of Bechtel; or
b) rightfully possessed by Bechtel without restriction prior to its disclosure to Bechtel; or
c) acquired from a third party without restriction, provided that Bechtel does not know, or have reason to know, or is not informed subsequent to disclosure by such third party and prior to disclosure by Bechtel that such information was acquired under an obligation of confidentiality; or
d) legally required to be disclosed; provided that Bechtel uses its reasonable best efforts to notify SCH and Owner of any request or subpoena for the production of any such information and provides SCH and Owner with an opportunity to resist such a request or subpoena.

5. Bechtel understands that SCH and/or Owner may make use of more than one group of expert consultants in connection with the Project and that, if SCH and/or Owner does so, SCH or Owner may share in their sole discretion any work product among the consultants retained, regardless of which consultants may have created the materials. **It is agreed that Bechtel is being engaged in anticipation of litigation or other dispute resolution process related to the Project but is not being engaged as a testifying expert. If Bechtel or its personnel become subject to any subpoenas, document requests or similar orders or demands on account of any such dispute resolution process, Bechtel will notify SCH before incurring any costs on account thereof and afford SCH the opportunity to resist such subpoenas, documents requests or similar orders or demands. Any costs incurred by Bechtel after such notice and opportunity to resist will be reimbursed to Bechtel by SCH, separate and apart from the Fee.**

6. **Bechtel will notify SCH when any of the following occurs:**

(a) the exhibition or surrender of any documents or records created by or submitted to Bechtel in connection with the Services, in any manner not expressly authorized by SCH;
(b) a request by anyone to examine, inspect or copy such documents or records;
(c) any attempt to serve, or the actual service of any court or agency order, subpoena or summons upon Bechtel which requires the production of any such documents or records.

7. If Bechtel receives a subpoena or a document request pursuant to the Federal Rules of Civil Procedure, to other United States federal or state rule or statute, or a court order or rule that appears to call for the disclosure or production of Confidential Material, Bechtel shall preserve and invoke any applicable privilege, immunity or other protection, and shall not voluntarily surrender any Confidential Material without providing, to the extent legally permissible, Owner and SCH a reasonable opportunity also to protect their respective interests in an appropriate court.

8. Upon request, Bechtel will immediately send to SCH any or all copies of work papers, records, samples, or other documents or materials (including computer files of any type) received, collected or prepared in connection with this Agreement regardless of their nature or whether they were created by Bechtel or others, subject to Bechtel's entitlement to retain an archival copy of its work product as provided in paragraph 4 of this Agreement.

9. At the conclusion of Bechtel's work in connection with the Project, all copies of work papers, records, samples or other documents or materials (including computer files of any type) received, collected, or prepared in connection with this Agreement will be destroyed, disposed of, or delivered to SCH, as directed by SCH, subject to Bechtel's entitlement to retain an archival copy of its work product as provided in paragraph 4 of this Agreement.

10. From this point forward, unless otherwise notified in writing by SCH, direction shall be taken from and correspondence shall be addressed and sent to SCH at:

George D. Wenick, Esq.
gdwenick@smithcurrie.com
Smith, Currie & Hancock **LLP**

2700 Marquis One Tower
245 Peachtree Center Avenue, N.E.
Atlanta, GA 30303-1227

The foregoing is not intended to prevent direct communication between Bechtel and the Owner.

11. Bechtel will submit invoices for services rendered to the attention of SCH at the above address. A copy of each invoice shall be sent simultaneously to Owner at an address to be provided.

12. Bechtel represents that it has investigated possible conflicts of interest and determined that no conflict exists that would impair its ability to perform the Services. As part of Bechtel's conflict analysis, it has determined and represents that none of its employees who will be providing the Services:

- Has received confidential information from Consortium or any other party or entity performing work at the Project.
- Has performed expert work for Consortium or any other party or entity performing work at the Project.
- Has been or is currently employed or engaged as a consultant by Consortium or any other party or entity performing at the Project.

Bechtel agrees to isolate its employees who will be providing the Services, while they are providing the Services, from all other employees who have or had a relationship with the Consortium or any other party or entity performing work at the Project that could create a conflict of interest and to notify SCH immediately if any conflict of interest should arise.

13. Bechtel agrees that information concerning this Project shall be disclosed only to its direct employees, who are also bound by the terms of this Agreement. To the extent that the involvement of additional individuals, who are not employees of SCH and/or Owner, becomes necessary, such persons shall be cleared by SCH, before receiving access to any information regarding the Project. Bechtel further agrees that all such individuals shall agree in writing to be bound by the confidentiality provisions of this Agreement before receiving access to such information.

14. If Bechtel is unable through no fault of its own to complete the Services to be rendered under this Agreement, as described on Attachment A to this Agreement, Bechtel's compensation will be calculated on a percent complete basis, based on the actual number of weeks spent by its personnel in performing under this Agreement (as against the eight (8) week planned

duration) times the amount of the Fee, with such compensation to be no less than the initial amount paid to Bechtel pursuant to paragraph 2 of this Agreement and not to exceed the lump sum Fee mentioned in paragraph 2 of this Agreement.

15. Bechtel and SCH agree that any dispute, controversy or claim arising out of, or relating to, this Agreement or the breach thereof shall be resolved by confidential, binding, and final arbitration between the parties. The arbitration shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules and judgment on the award rendered by the arbitrators may be entered in any court having jurisdiction thereof. The seat or place of arbitration shall be in Atlanta, Georgia.

16. This Agreement, and all questions relating to its validity, interpretation, performance and enforcement, is governed by Georgia law without regard to its principles of conflicts of law.

17. Bechtel shall perform the Services in accordance with the standard of skill and care typically exercised by consultants performing services of a similar nature in the nuclear industry. To the maximum extent permitted by applicable law, Bechtel's cumulative aggregate liability arising out of or in connection with this Agreement, from any and all causes, shall not exceed the amount of the Fee. In no event will Bechtel be liable for any special, indirect, incidental, or consequential losses or damages whatsoever arising out of or in connection with this Agreement, whether in contract, tort (including negligence), or otherwise.

18. This Agreement constitutes the sole and entire agreement between Bechtel and SCH with respect to the subject matter of this Agreement, and supersedes all prior and contemporaneous understandings, agreements, representations, and warranties, both written and oral, with respect to the subject matter.

Signed and agreed to this 6th day of August 5th ;2015.

Bechtel Power Corporation

By: _____
Name: [illegible]
Title: PRESIDENT OF SPG

Smith, Currie & Hancock, LLP

By: _____
Name: George D. Wenck
Title: Partner

ATTACHMENT A TO PROFESSIONAL SERVICES AGREEMENT

I. ASSEMENT OBJECTIVES

The objective of Bechtel's assessment is to assist SCH and Owners in better understanding the current status and potential challenges of the Project in anticipation of litigation and also to help ensure the Project is on the most cost efficient trajectory to completion.

Bechtel will assemble a team of senior subject matter experts experienced in the various aspects of nuclear and large scale complex project execution to perform this assessment. Bechtel's team will be supported by the institutional knowledge of Bechtel's 4,400 person strong Nuclear, Safety and Environmental business unit that is the home of Bechtel's full-scope nuclear capabilities - i.e., "cradle to grave" experience from research and development and EPC project execution through commissioning and operations and decommissioning.

Bechtel's team will evaluate the current status and forecasted completion plan through the design, supply chain, and construction aspects of the Project. They will focus on understanding the issues that have caused impacts to date, assessing the effectiveness of the mitigation plans put into place to address those issues, and reviewing the project management tools and work processes being employed to plan and execute the Project, including change management, through completion and turnover of the units.

To accomplish this, Bechtel will leverage the lessons learned from helping owners assess and complete nuclear projects over the last 30 years, including ongoing work on the Watts Bar Unit 2 Completion and Olkiluoto 3 projects. Bechtel's assessment will take place at the Project site, select module fabrication facilities, and the design office, if supported by the Consortium.

II. EXECUTION APPROACH:

A. Data Validation Phase

Initially, a small team of senior Bechtel subject matter experts, experienced in mega-project construction, nuclear new builds, and project management, will seek to gain a better understanding of the current state of the Project. This data validation phase will last approximately one week, will take place at the Project site with Owner's organization and, ideally, include input from both Consortium members. The goal during this phase of the assessment will be for the Bechtel team to better understand the available Project progress data and metrics and see how they compare to Bechtel's project standards (e.g., the level of detail included, who it is produced by, and the frequency with which it is published).

The Bechtel team will also gain insight into the execution control processes and seek to confirm some of the drivers of the current status. This phase would conclude with a validation of the path forward to complete the assessment, including denoting the required level of cooperation necessary by the Consortium to produce the optimal evaluation and recommendations for the assessment.

The following is a list of documents that the Owner will provide to Bechtel at least one week in advance of Bechtel's initial visit to the Project site:

- Owners organization structure that oversees the Project
- Consortium organization chart(s) for the Project (down to the department/functional and site leads including field superintendents)
- Recent monthly progress report(s)
- Documents as listed in Bechtel's emails to SCE&G during June-July 2015 timeframe.

Bechtel activities during the initial data validation phase will include:

- Review Project reports and documentation available to Owner, including, but not limited to the following:
  - Project execution plans and/or procedures
  - Owner and Consortium organizational charts
  - Project schedule hierarchy - e.g., milestone management schedule, supported by increasing levels of detailed, integrated EPC schedules
  - Monthly progress reports
  - Cost and/or schedule forecasts, including staffing projections
  - Supply chain information, including module fabrication/production schedules for each facility and quality findings
  - Action item/issue management lists
- Meet with key Owner personnel to understand the following:
  - Discuss the evolution of the Project to date, including impacts and changes
  - The current state of relations between Owner and Consortium
  - Understand any financing time constraints, lender commitments or lender rights that could influence the path to completion

- Hold discussions with Consortium to gain an understanding of the challenges facing the Project to date; and what it will take to deliver the Project.

- Discuss options for securing Consortium's cooperation and engagement during completion of the assessment

- Oral report to Owner on progress during this phase and confirmation on the path forward for the remainder of the assessment

B. Site Walk Down

With the completion of the data validation phase, the remainder of the assessment team will mobilize at the Project site. Upon arrival, the Bechtel team will complete the required site access training (as necessary) to reduce the administrative burden on Owner's team during Bechtel's assessment. After completion of training, a kick-off meeting will be held between Owner and Bechtel to ensure alignment of goals and expectations as well as needed support. Following the kickoff meeting, a walk down of the V.C. Summer site including temporary facilities and laydown areas for material and equipment, will be necessary in order for the Bechtel team to gain familiarity with the site layout before beginning the interview process with the Owner team.

C. Leadership Team Interviews

Following the site walk down, the Bechtel team will interview the Owner leadership team members. The list of the leadership team members in question will be provided at the conclusion of the data validation phase. The interviews will take place at the appropriate locations - namely at the Project site, the Consortium's design offices, and the module fabrication facilities. The entire Bechtel team typically participates in each of the interviews, as they are intended to provide the Bechtel team with a broad overview of each function/department and the major issues or concerns for each area. This information will assist the Bechtel team in understanding how the Consortium is organized and managed and in gauging the current EPC culture and potential impacts to the execution approach on the Project.

Armed with this information, the Bechtel team will then focus its efforts on specific areas of concern during the functional breakout sessions. Should the Consortium choose to participate, the Bechtel team will perform this same process with the Consortium's leadership team, which will also help assess the leadership organization and its effectiveness.

D. Functional Breakout Sessions

With the completion of the leadership interviews, the Bechtel team will proceed to the functional breakout sessions. During this period, the Bechtel team will break out by their assigned functional area and work directly with Owner's and Consortium's team managers responsible for their respective functions. The Bechtel team will focus on a review of the various tools, documents, and reports and their ability to support the efficient and timely planning, management and completion of the Project. Because the Bechtel team members have cross-functional experience and expertise, it may become necessary for short periods of time for Bechtel team members working in other areas to temporarily redirect their efforts to specific issues as appropriate. This team will focus not only on the nuclear island progress, but also on the status of the balance of plant (BOP) engineering, procurement and construction effort to ensure "off-critical path" work is receiving the proper attention required to support the completion plan.

E. Final Report

The completion of the assessment will take approximately seven weeks following the initial data validation phase. The Bechtel Team will then provide its report orally or in writing, as the Owner's option. Following the Owner's receipt of this report, Bechtel will meet with the Owner's team to discuss any questions the Owner may have. Within one week of Owner's receipt of the report, the Owner will issue a notice to Bechtel either confirming that the Services have been completed in accordance with the Agreement or identifying the specific services which the Owner believes remain to be performed in order for the Services to be completed in accordance with the Agreement.

F. Key Team Members

An indicative list of the senior Bechtel subject matter experts expected to be used for the assessment team is set out below:

- Carl Rau - Executive Management
- Dick Miller - Project Management and Site Team Leader
- Mike Robinson, George Spindle, and Greg Corbett Construction
- Jason Moore - Project Controls
- Ed Sherow - Design Engineering
- Steve Routh - Licensing
- Bob Exton - Supply Chain Management
- Vic Chrjapin, Quality

Bechtel will also use such additional personnel as may be necessary to complete the assessment.

From: BYNUM, ALVIS J JR(/O=SCANA/OU=COLUMBIA/CN=RECIPIENTS/CN=ABYNUM)
To: Pelcher, Steve (stephen.pelcher@santeecooper.com)
CC: LINDSAY, RONALD
BCC:
Subject: FW: Message from "RNP0026738D1D5A"
Sent: 07/08/2015 09:58:40 AM -0400 (EDT)
Attachments:

George - given the implications, I think that we would want you to draft something that you would comfortable with - Al

-----Original Message-----
From: Wenick, George [mailto:gdwenick@smithcurrie.com]
Sent: Wednesday, July 08, 2015 9:57 AM
To: BYNUM, ALVIS J JR
Cc: LINDSAY, RONALD
Subject: RE: Message from "RNP0026738D1D5A"

***This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source.

_____

Al,

My practice is to engage experts directly in situations like through a written agreement. In this case, that agreement should be clear in stating that Bechtel is being engaged as an expert in anticipation of litigation, which is necessary to make its reports privileged, as we have previously discussed. That would be in tension with the following statement on page 1 of its Assessment Proposal:

"For clarity this team will not evaluate the ownership of past impacts or validity of pending or future claims."

If you wish, I will draft a personal service agreement, using a form that we have used in the past, combined with Bechtel's Assessment Proposal.

George

From: BYNUM, ALVIS J JR(/O=SCANA/OU=COLUMBIA/CN=RECIPIENTS/CN=ABYNUM)
To: MARSH, KEVIN B;ARCHIE, JEFFREY B;LINDSAY, RONALD
CC:
BCC:
Subject: Fw: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3
Sent: 07/15/2015 02:58:41 PM -0400 (EDT)
Attachments:

Sent from my BlackBerry 10 smartphone on the Verizon Wireless 4G LTE network.

From: Baxley, Mike <mike.baxley@santeecooper.com>
Sent: Wednesday, July 15, 2015 2:36 PM
To: Wenick, George
Cc: Baxley, Mike; BYRNE, STEPHEN A; BYNUM, ALVIS J JR; LINDSAY, RONALD; Crosby, Michael; Pelcher, Steve
Subject: Re: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3

George, thank you for your email on how we structure Bechtel's engagement. You raise some very good points. It is my understanding the Owner CEO's met with Bechtel earlier this week and there is some change in previous thinking on this, away from the litigation potential towards open disclosure of findings among the parties. My suggestion at this point is two fold. First, we schedule an internal phone call among the Owners' lawyers to finalize details. Then, we arrange a meeting between all lawyers, including Bechtel, to get this straight among the entire group. Otherwise, I suspect there will be inordinate delay in getting the contract completed. Would you be agreeable to this?

Mike Baxley

Begin forwarded message:

> **From:** "Wenick, George" <gdwenick@smithcurrie.com>
> **Date:** July 14, 2015 at 9:14:15 AM EDT
> **To:** "Baxley, Mike" <mike.baxley@santeecooper.com>, "BYRNE, STEPHEN A" <SBYRNE@scana.com>, "BYNUM, ALVIS J JR" <ABYNUM@scana.com>, "LINDSAY, RONALD" <RONALD.LINDSAY@scana.com>
> **Cc:** "Crosby, Michael" <michael.crosby@santeecooper.com>, "Pelcher, Steve" <stephen.pelcher@santeecooper.com>
> **Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3**
>
> Mike,
> Your email raises the question of whether (1) we should obtain the Consortium's cooperation with Becthel's assessment effort, or (2) we should protect Bechtel's work from forced disclosure in case of litigation. But I do not believe that is the dichotomy that we face.
> My understanding is that the Consortium has not said that it would cooperate with the Bechtel assessment, if we would agree to provide it with a copy of the eventual report. And the Consortium is unaware of the current draft of the Bechtel services agreement, so it could not have said that it would cooperate if we removed the reference to anticipated litigation in that agreement. Instead, the Consortium has provided us with an extremely restrictive non-disclosure agreement and stated that its

cooperation was conditioned on our execution of the NDA. We cannot sign that NDA.
The Consortium's proposed NDA would restrict the uses to which we could eventually put the Bechtel report. For example, we would be prohibited from using Bechtel's conclusions in subsequent litigation. Thus, if Bechtel concluded that the Consortium grossly mismanaged a specific aspect of its work or schedule, we could not cite Bechtel for this conclusion. Moreover, the Consortium would be expected to argue that we could not even raise the issue, even if we do not cite Bechtel, on the grounds that we learned of the issue solely because of Bechtel's involvement and the Consortium's involvement. Unless the Consortium drops the demand that we executed the proposed NDA, we have no reason to modify the current draft of the Bechtel services agreement. If it eventually drops that demand, then the Owner can revisit the question of whether it will share the report with the Consortium.
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George

From: Baxley, Mike [mailto:mike.baxley@santeecooper.com]
Sent: Monday, July 13, 2015 11:20 AM
To: BYRNE, STEPHEN A; BYNUM, ALVIS J JR; Wenick, George; LINDSAY, RONALD
Cc: Crosby, Michael; Pelcher, Steve
Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3
Gentlemen-
Michael Crosby has shared this internal email with me. I am concerned that hiring Bechtel through legal counsel, and certain phrases in the proposed agreement that Bechtel is hired "for the purpose of assisting counsel in giving legal advice to the owner" will result in failure of this initiative. Westinghouse and CBI will not cooperate if they see this as an effort to cultivate an expert witness, and this is not consistent with our initial discussions with the Consortium on this. We are sensitive to your concerns about disclosure, but definitely feel that the Owners need to be the hiring agency, and the report from Bechtel must be available to Westinghouse and CBI.
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Mike Baxley

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> **From:** "BYRNE, STEPHEN A" <SBYRNE@scana.com>
> **Date:** July 8, 2015 at 9:33:02 AM EDT
> **To:** "BYNUM, ALVIS J JR" <ABYNUM@scana.com>
> **Cc:** "'Crosby, Michael'" <michael.crosby@santeecooper.com>, "ARCHIE, JEFFREY B" <JARCHIE@scana.com>

Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3

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Subject: FW: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3
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To: BYNUM, ALVIS J JR
Subject: FW: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3
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Sent: Wednesday, July 08, 2015 9:01 AM
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Subject: Re: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3
Al - Good day to you
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Thanks
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From: Daw, Martyn
Sent: Wednesday, June 24, 2015 7:32 AM
To: 'BYNUM, ALVIS J JR'; 'Pelcher, Steve'
Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3 [*EXTERNAL*]
Al/Steve - my business folk have requested an update as to the plan for getting the Purchase Order/contract in place.
I'm currently in the UK on business but can be available for a call at your convenience.
Please let me know
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Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3 [*EXTERNAL*]
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It would be good to get the PO/contract in place before the kick-off meeting which I think is planned for July 1.
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Cc: Cherry, Marion; Crosby, Michael; LINDSAY, RONALD; BYRNE, STEPHEN A; Albert, Craig
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Attached is a pdf of the Proprietary Data Agreement signed by Bechtel Power Corporation. Please can Al or you let me know if you'd like me to send along the original with the wet signature.
I look forward to hearing from you/Al as to the path forward with respect to getting a PO in place. As I indicated on the phone, we are flexible on this and we are willing to be retained by your outside counsel if you believe that would be preferable.
On the documents side, I believe that Dick Miller will be point of contact for Bechtel but I am confirming this as I write.
Thanks again for the discussion this morning
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Sent: Monday, June 01, 2015 12:04 PM
To: Daw, Martyn; Bynum, Alvis
Cc: Cherry, Marion; Crosby, Michael; Lindsay, Ronald ; Byrne, Stephen A.; Albert, Craig
Subject: RE: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3 [*EXTERNAL*]
Martyn/Al: It was great speaking with you this morning.
As a follow up to our conversation, I believe that the very first action item will be for Bechtel to send a partially executed copy of the Proprietary Data Agreement to Al Bynum for the Owner's countersignature. Please keep Santee

Cooper in the loop so that Santee Cooper might have a fully executed copy of that agreement for our records.

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Thanks again for the good conversation.

Let's stay in touch.

Steve

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Sent: Monday, June 01, 2015 9:28 AM
To: Pelcher, Steve; Daw, Martyn ; Bynum, Alvis
Subject: Implementing Bechtel's Assessment of V.C. Summer Units 2 and 3
When: Monday, June 01, 2015 11:00 AM-11:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: Dial-in Number: (877)635-0568; Participant Code: 8437614016

Date of Call: June 1, 2015
Time of Call: 11:00AM
Duration of Call: 30 Minutes
Dial-in Number: (877)635-0568
Participant Code: 8437614016

Discuss:

1. Process for execution of "Proprietary Data Agreement."
2. Process of jump starting Bechtel's review of documents consistent with Proprietary Data Agreement and Section 19.3 of the EPC.
3. Process of Owners executing a PO with Bechtel.

Mike Baxley

On Jul 14, 2015, at 9:15 AM, Wenick, George <gdwenick@smithcurrie.com> wrote:

Mike,
Your email raises the question of whether (1) we should obtain the Consortium's cooperation with Becthel's assessment effort, or (2) we should protect Bechtel's work from forced disclosure in case of litigation. But I do not believe that is the dichotomy that we face.
My understanding is that the Consortium has not said that it would cooperate with the Bechtel assessment, if we would agree to provide it with a copy of the eventual report. And the Consortium is unaware of the current draft of the Bechtel services agreement, so it could not have said that it would cooperate if we removed the reference to anticipated litigation in that agreement. Instead, the Consortium has provided us with an extremely restrictive non-disclosure agreement and stated that its cooperation was conditioned on our execution of the NDA. We cannot sign that NDA.
The Consortium's proposed NDA would restrict the uses to which we could eventually put the Bechtel report. For example, we would be prohibited from using Bechtel's conclusions in subsequent litigation. Thus, if Bechtel concluded that the Consortium grossly mismanaged a specific aspect of its work or schedule, we could not cite Bechtel for this conclusion. Moreover, the Consortium would be expected to argue that we could not even raise the issue, even if we do not cite Bechtel, on the grounds that we learned of the issue solely because of Bechtel's involvement and the Consortium's involvement. Unless the Consortium drops the demand that we executed the proposed NDA, we have no reason to modify the current draft of the Bechtel services agreement. If it eventually drops that demand, then the Owner can revisit the question of whether it will share the report with the Consortium.
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Date of Call: June 1, 2015
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Duration of Call: 30 Minutes
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****

Confidentiality Notice:
This message is intended exclusively for the individual or entity to which it is addressed. This communication may contain information that is proprietary, privileged, confidential or otherwise legally exempt from disclosure. If you are not the named addressee, you are not authorized to read, print, retain, copy or disseminate this message or any part of it. If you have received this message in error, please notify the sender immediately either by phone or reply to this e-mail, and delete all copies of this message.

AGREEMENT REGARDING OWNER'S PROJECT ASSESSMENT

This Agreement Regarding Owner's Project Assessment ("Agreement") is made and effective as of August 7, 2015 ("Agreement"), by and among SOUTH CAROLINA ELECTRIC & GAS COMPANY, a South Carolina corporation ("SCE&G"), acting for itself and as agent for SOUTH CAROLINA PUBLIC AUTHORITY, a public body corporate and politic created by the laws of South Carolina (collectively "Owner"), and a consortium consisting of WESTINGHOUSE ELECTRIC COMPANY LLC, a Delaware limited liability company having a place of business in Cranberry, Pennsylvania ("Westinghouse"), and CB&I STONE & WEBSTER, INC. (fka "STONE & WEBSTER, INC."), a Louisiana corporation having a place of business in Charlotte, North Carolina ("Stone & Webster") (collectively "Contractor"). Owner, Westinghouse, and Stone & Webster may be referred to individually as "Party" or collectively as "Parties."

RECITALS

WHEREAS, the Parties entered into an Engineering, Procurement and Construction Agreement dated as of May 23, 2008 ("EPC Agreement") for the supply of Units 2 and 3 at the V.C. Summer Nuclear Generating Station ("Project"); and

WHEREAS, Owner wishes to engage Bechtel Power Corporation ("Bechtel") to perform a legally-privileged assessment ("Assessment") of the Project as set forth in this Agreement.

NOW, THEREFORE, in consideration of the recitals and the mutual promises herein, the Parties stipulate and agree as follows:

AGREEMENT

1. The Parties acknowledge that the EPC Agreement, Article 19, provides a mechanism for the disclosure of Proprietary Data and establishes a distinction between Contractor Disclosable Information and Contractor Non-Disclosable Information. Owner has represented to Contractor that Bechtel has previously signed an agreement in the form of Exhibit O-1 to the EPC Agreement. The disclosure of Contractor Disclosable Information remains governed by the EPC Agreement and is not affected by this Agreement. This Agreement affects only Contractor Non-Disclosable Information and certain types of future oral statements by Contractor personnel.

2. Owner, by and through its attorneys, plan to retain Bechtel to perform an Assessment of the Project. Bechtel shall, only through certain of its employees who are so designated and agreed upon by Owner, perform its Assessment at the direction of Owner's counsel, and the Assessment process and any documents issued in conjunction therewith shall constitute privileged and non-discoverable attorney-directed work product. The purpose of the Assessment is to assist in Owner's counsel's provision of legal advice to Owner relating to the Project. Owner and Contractor agree that the Assessment and all papers, documents and communications generated by Owner, Owner's attorneys and Bechtel as a result of, in

connection with, arising out of or relating to Owner's Assessment (collectively, "Assessment Work Product"), including the Assessment report itself, are intended to be and shall be legally privileged as attorney-directed work product and attorney-client privileged communications. Owner agrees to take all reasonable steps to ensure that Owner and Bechtel preserve and assert all privileges related to the Assessment and Assessment Work Product to the fullest extent permitted by law. Owner and Contractor agree that Bechtel is a non-testifying expert as provided by Fed.R.Civ. P. 26(b)(4)(D).

3. Owner agrees that it will not provide any Contractor Non-Disclosable Information of Contractor to Bechtel or any other non-Party without Stone & Webster's and Westinghouse's prior written consent, which consent shall not be unreasonably withheld. Stone & Webster and Westinghouse may withdraw any such further consent at any time with or without cause. SCE&G shall notify Westinghouse and Stone & Webster of any breach by Bechtel of which it becomes aware. It is agreed that disclosure by the Parties of any Contractor Non-Disclosable Information to Bechtel or to any other non-Party shall be made in a secure data room maintained by Stone & Webster in Charlotte, NC and/or Westinghouse. Removing or machine copying of such data or information by/for Bechtel (or other non-Party) is not permitted.

4. Upon reasonable notice, Contractor agrees to provide reasonable support for Owner's Assessment by making Contactor's Project personnel available for interviews and/or consultation during normal business hours and upon reasonable notice. Contractor shall have the right to have counsel present during any such interviews or consultations. The Parties agree that any oral statements or communications made by Contractor's Project personnel in support or furtherance of Owner's Assessment shall constitute exchanges made as part of settlement and compromise negotiations pursuant to Fed.R.Evid. 408 and shall not be admissible in any court, administrative, dispute resolution or other proceeding by or among any of the Parties or any non-Party for any purpose whatsoever. Nothing herein is intended to prevent a Party from taking any discovery in any such proceeding, including discovery concerning any subject matter addressed during such interviews or consultations, as permitted by law and/or the applicable rules of procedure.

5. Nothing in this Agreement shall be construed as creating an obligation on the part of Contractor to disclose any information or documents to Owner beyond what is required by the EPC Agreement.

6. This Agreement, all acts in furtherance of this Agreement, and all papers, documents and communications generated as a result of or in connection with this Agreement are proprietary and confidential. Owner and Bechtel agree that they shall not disclose the same to any non-Party (except to an affiliate of Stone & Webster or Westinghouse, or attorney thereto) unless otherwise agreed in writing by all of the Parties or unless required by law. In the event Owner or Bechtel is required by law to disclose information arising out of or in connection with this Agreement, such Party shall immediately notify Contractor and shall take all available steps, including cooperating with Contractor, to prevent or minimize the disclosure. Owner agrees to use

all reasonable efforts to hold, maintain and assert all legal privileges to protect against the disclosure of information to a non-Party.

7. No aspect of this Agreement, nor any discussions, communications, information, or documents exchanged by or among the Parties in furtherance of this Agreement shall be construed as an admission of any sort by any Party, including without limitation, an admission of any fact, circumstance or conclusion or of any knowledge or potential liability whatsoever under the EPC Agreement. The Assessment and the Assessment Work Product shall constitute the work-product of Owners and do not include or reflect any opinions, assessments or evaluations of Contractor or its personnel. Contractor will not participate in the selection of Bechtel personnel who shall conduct or participate in the Assessment or generate the Assessment Work Product, and Contractor does not in any way endorse the capabilities, experience or qualifications of such personnel or the validity, accuracy or thoroughness of their work product. Contractor shall not review, revise, edit or in any way approve, endorse or criticize the Assessment or Assessment Work Product and in no way approves of or endorses their content.

8. No Party to this Agreement shall be construed as having waived any of its positions, arguments, entitlements, rights or remedies under the EPC Agreement or the Consortium Agreement between Westinghouse and Stone & Webster dated as of May 23, 2008, as amended ("Consortium Agreement"). The Parties agree that all such positions, arguments, entitlements, rights, or remedies are expressly reserved by the Parties.

9. No Party to this Agreement shall be construed as having admitted that it has, or by conducting any acts in furtherance of this Agreement is undertaking, any specific obligation under the EPC Agreement or the Consortium Agreement.

10. Nothing in this Agreement shall commit any Party to, nor constitute, any change, modification, or amendment to the EPC Agreement or the Consortium Agreement.

11. Article 34.1 of the EPC Agreement is incorporated herein by reference.

12. Unless otherwise agreed by the Parties in writing or the cost or expense is otherwise compensable under the EPC Agreement, the Parties shall bear their own costs and expenses in performing their respective roles and responsibilities hereunder.

13. This Agreement may be executed by the Parties in counterparts and electronically submitted documents shall be valid.

14. As a Party to this Agreement, Contractor shall be entitled to injunctive relief to ensure that Owner and Bechtel maintain, and aggressively assert, the privileges available to each, including but not limited to those set forth in this Agreement.

IN WITNESS WHEREOF, the Parties, intending to be bound hereby, execute this Agreement by their duly authorized representatives.

South Carolina Electric & Gas Company,
for itself and as agent for South Carolina Public Authority

By: Stephen A. Byrne

Name: STEPHEN A. BYRNE

Title: PRESIDENT - GENERATION & TRANSMISSION

Date: 7 AUGUST 2015

Westinghouse Electric Company LLC

By:

Name: JEFFREY A. BENJAMIN

Title: SR VP NEIMP

Date: 07 August 2015

CB&I Stone & Webster, Inc.

By: Donald DeFlorio

Name: Donald DeFlorio

Title: Sr. Vice President - Operations

Date: 06 August 2015

From: Albert, Craig(cmalbert@Bechtel.com)
To: MARSH, KEVIN B;Lonnie Carter
CC:
BCC:
Subject: Bechtel Assessment
Sent: 08/21/2015 07:49:02 AM -0400 (EDT)
Attachments:

_____

Kevin, Lonnie,

I've been having at least twice-weekly calls with Carl Rau regarding the assessment. Things are progressing much slower than necessary and we believe this warrants both of your attention.

We have received a fair amount of qualitative data but are significantly lacking the important engineering, procurement, and construction quantitative data necessary to perform a comprehensive schedule and cost assessment of the to-go effort. In fact, just today the consortium requested yet another face to face meeting, the third, to better understand our request for engineering data. This, coupled with other observations and impediments leads us to believe that Carl should lead a weekly "CEO Update Call". During the call Carl will address progress, obstacles, suggestions, etc...

We're flexible as to whether this call is at a fixed day/time each week or schedule as we go. Suggest we start ASAP but no later than early next week. I also suggest this call be limited to the four of us so we can talk freely with regard to any and all impediments to success.

Let me know.

Thanks much,

Craig

INFRASTRUCTURE
MINING & METALS
NUCLEAR, SECURITY & ENVIRONMENTAL
OIL, GAS & CHEMICALS

V.C. Summer
Nuclear Generating Station Units 2 & 3

Project Assessment Report

February 5, 2016

Strictly Confidential to Bechtel, SCE&G, and SCPSA

34°17'55"N | 81°18'53"W

V.C. Summer Nuclear Generating Station Jenkinsville, SC USA

This Report was prepared by Bechtel Power Corporation (Bechtel) expressly and exclusively for the purpose stated in the Professional Services Agreement between (1) Bechtel and (2) Smith, Currie & Hancock LLP (SCH) in its capacity as legal representative of South Carolina Electric & Gas Company and South Carolina Public Service Authority (together the Owners). Any use of this Report (or any part thereof) for any different purpose is expressly not authorized.

This Report includes materials based on Bechtel's intellectual property (including Bechtel know-how), as well as Bechtel's industry experience and knowledge. Any disclosure of any such material beyond SCH and the Owners is not authorized.

Except where specifically stated to the contrary, the information contained in this Report was provided to Bechtel by others and has not been independently verified or otherwise examined to determine its accuracy, completeness or feasibility. In addition, the report relies upon certain assumptions which have been made. Any person's unauthorized use of or reliance on this Report or any information contained in this Report shall be at such person's sole risk.

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Abbreviations and Acronyms

BIP	Boundary Identification Package
BPO	Blanket Purchase Order
CB&I	Chicago Bridge & Iron
CFPC	Certified for Procurement and Construction
CGD	Commercial Grade Dedication
COD	Commercial Operation Date
COLA	Combined License Application
CTG	Component Test Group
DAC	Design Acceptance Criteria
DCD	Design Control Document
DCP	Design Change Proposal
DD	Design Deliverables
E&DCR	Engineering & Design Coordination Report
EDC	Engineering Design Completion
eFIN	engineering Finish It Now
EPC	Engineering, Procurement, and Construction
FSAR	Final Safety Analysis Report
I&C	Instrumentation & Controls
IFC	Issued for Construction
ITAAC	Inspections, Tests, Analyses, and Acceptance Criteria
ITP	Initial Test Program
JTWG	Joint Test Working Group
LAR	License Amendment Request
MAB	Module Assembly Building
N&D	Non-Conformance and Disposition Report
NRC	Nuclear Regulatory Commission
NSSS	Nuclear Steam Supply System
O&R	Observation & Recommendation
OCC	Operations Control Center
P&ID	Piping & Instrumentation Diagram
PMO	Project Management Organization
POD	Plan of the Day
PTG	Preoperational Test Group
RFID	Radio Frequency Identification
ROYG	Red-Orange-Yellow-Green
SCE&G	South Carolina Electric & Gas
SCH	Smith, Currie & Hancock LLP
SCPSA	South Carolina Public Service Authority
STG	Startup Test Group
UIN	Early Uncompleted ITAAC Notification
WBS	Work Breakdown Structure
WEC	Westinghouse Electric Company
WP	Work Package

Executive Summary

In accordance with a Professional Services Agreement signed on August 6, 2015 between Bechtel Power Corporation and Smith, Currie & Hancock LLP (SCH), Bechtel performed an assessment of the Virgil C. Summer Nuclear Generating Station (V.C. Summer) Units 2 & 3 project. The objective of the assessment was to assist SCH and the Owners (South Carolina Electric & Gas Company (SCE&G) and South Carolina Public Service Authority (SCPSA)) to better understand the current status and potential challenges of the project to help ensure the project is on the most cost efficient trajectory to completion.

Based on Bechtel's assessment, there are significant issues facing the project:

- While the Consortium's engineering, procurement, and construction (EPC) plans and schedules are integrated, the plans and schedules are not reflective of actual project circumstances.
- The Consortium lacks the project management integration needed for a successful project outcome.
- There is a lack of a shared vision, goals, and accountability between the Owners and the Consortium.
- The Contract does not appear to be serving the Owners or the Consortium particularly well.
- The detailed engineering design is not yet completed which will subsequently affect the performance of procurement and construction.
- The issued design is often not constructible resulting in a significant number of changes and causing delays.
- The oversight approach taken by the Owners does not allow for real-time, appropriate cost and schedule mitigation.
- The relationship between the Consortium partners (Westinghouse Electric Company (WEC) and Chicago Bridge & Iron (CB&I)) is strained, caused to a large extent by commercial issues.

Observations and recommendations are identified in the report for each functional area—project management, engineering and licensing, procurement, construction and project controls, and startup. Recommendations are identified as Priority "1" or "2" based on the degree to which implementation of the recommendation will help to ensure that the project is on the most cost efficient trajectory to completion. The overall top priority recommendations from Bechtel's assessment are:

- Owners – Develop an Owners' Project Management Organization (PMO) and supplement current Owner staff with additional EPC-experienced personnel.
- Owners and Consortium – Align Contract commercial conditions with the project goals and determine the realistic to-go forecast costs for project completion.
- Consortium – Create a new, more achievable, project schedule. Remove the mandatory constraints from the Integrated Project Schedule and allow the schedule to move based on the logic. Prioritize the development of mitigation/recovery plans based on their impact to the schedule. Ensure appropriate time is allocated for the installation of bulk commodities (large and small bore piping, pipe supports, cable tray, conduit, cabling).
- Consortium – Initiate a focused effort to complete WEC known engineering "debt" and release the over 1,000 drawing holds that exist.
- Consortium – Intensify the efforts of the Strategic Planning group, work package planning, constructability reviews, etc. to identify design changes needed well in advance of the construction need date. Stay on top of identifying and resolving emergent technical issues.
- Consortium – Increase manual staffing levels to allow working of all available work areas. Evaluate methods to have the craftsmen spend more time at the workface. Implement actions to improve craft productivity and retention. Simplify and streamline work packages.
- Consortium – Complete the inventory revalidation effort and establish a program to continually validate inventory. Complete the procurement schedule adherence effort to ensure equipment delivery dates meet construction need dates.

The recently announced stock purchase acquisition of CB&I's nuclear business by WEC, the hiring of Fluor, and the settlement agreement with the Owners will resolve many of the Consortium-related commercial issues in the near term. It also provides a valuable safety net for the Owners if the project cost continues to rise. However, this new arrangement will not fully address the project challenges and EPC shortcomings that we have observed and documented. Based on our understanding of the project, we recommend that the Owners establish a stronger EPC capable oversight function to ensure optimal EPC and cost-effective decision-making, and to ensure the best outcome for the project. Further, we believe it is in the best interest of the Owners for the oversight function to have the perspective of both owner and practitioner, and for it to be demonstrably robust. This will surface issues more quickly, facilitate optimal resolutions, and ensure success moving forward. It will also put the Owners in the best position for all potential project outcomes.

1. Introduction

1.1 Assessment Scope

In accordance with the August 6, 2015 Professional Services Agreement, Bechtel's team evaluated the current status and forecasted completion plan through the design, supply chain, and construction aspects of the project. The focus of the assessment was on understanding the issues that have caused impacts to date, assessing the effectiveness of the mitigation plans put into place to address those issues, and reviewing the project management tools and work processes being employed to plan and execute the project, including change management, through completion and turnover of the units.

The following process was used to perform the assessment:

- Data validation
- Site walkdowns
- Leadership team interviews
- Functional breakout sessions
- Preparation of report

Areas reviewed during the assessment included project management, engineering and licensing, procurement, construction and project controls, and startup. A specific assessment of the project schedule is not included in this report.

During the assessment period, the Bechtel team:

- Reviewed 353 Consortium and Owner documents
- Attended 70 meetings with Consortium and Owner personnel
- Conducted 35 interviews of Consortium and Owner personnel
- Completed 24 site walkdowns/real-time observations
- Attended 7 subject-specific presentations

1.2 Documents Reviewed

The assessment is based on the data, schedule, and other information provided to the team by the Consortium and the Owners during August, September, and October 2015. A listing of documents received and reviewed during the assessment is provided in Appendix A. Some data and information was provided electronically by the Owners and the Consortium. For the majority

of data and information, a single hard copy was placed in a reading room at the site and no additional copies could be made. This limited the ability of the Bechtel team to fully assess the information (e.g., engineering schedules, ROYG (red-orange-yellow-green) report, etc.). Further, many documents that contained sensitive information (e.g., contract terms, financial details, etc.) were redacted.

Materials received, collected, or prepared by Bechtel in connection with the assessment are the property of the Owners and were treated as confidential by Bechtel.

1.3 Assessment Team

The assessment was performed by the following Bechtel professionals:

Dick Miller	Manager of Operations, Assessment Project Lead
Carl Rau	Executive Sponsor
George Spindle	Construction Manager
Mike Robinson	Construction Manager
Ed Sherow	Engineering Manager
Ron Beck	Project Manager (Engineering and Construction)
Steve Routh	Project Manager (Engineering and Licensing)
Bob Exton	Procurement Manager
Jason Moore	Project Controls Manager
Jonathon Burstein	Project Controls Manager
Bob Pedigo	Startup Manager
Jerry Pettis	Project Administrator
Reviewers	
Ty Troutman	Principal Vice President, Assessment Reviewer
John Atwell	Principal Vice President, Assessment Reviewer

The collective experience of these senior managers includes:

- Over 500 years of total experience
- Over 300 years of EPC nuclear experience
- Project management experience on over 85 EPC projects

Resumes of the Bechtel assessment team personnel are included in Appendix B.

1.4 Assessment Timeline

Key dates included:

July 1, 2015	Initial data request issued by Bechtel
August 6, 2015	Agreement signed
August 13, 2015	Kickoff meeting with the Owners and the Consortium
August 14, 2015	Initial documents received from the Consortium
August 19, 2015	Portions of Integrated Project Schedule received from the Consortium
September 8, 2015	Bechtel team mobilized to site
September 9, 2015	Consortium presentation to Bechtel team
September 8, 2015 to October 16, 2015	Bechtel team at site performing walkdowns, interviews, document reviews, etc.
October 22, 2015	Bechtel presentation to SCH, SCE&G, and Santee Cooper
November 12, 2015	Bechtel draft report issued to SCH
February 5, 2016	Bechtel final report issued to SCH

Copies of Bechtel's weekly reports to SCE&G and Santee Cooper are provided in Appendix C.

1.5 Observations and Recommendations

Observations and recommendations are identified in the report for each functional area—project management, engineering, procurement, construction and project controls, and startup. Recommendations are prioritized as follows:

- Priority 1 – Implementation of this recommendation will significantly help to ensure the project is on the most cost efficient trajectory to completion.
- Priority 2 – Implementation of this recommendation will help to ensure the project is on the most cost efficient trajectory to completion.
- Other – Other recommendations identified by the assessment team.

2. Project Management

This section describes the assessment of the project management aspects of the project. Section 2.1 provides a summary of the assessment. Section 2.2 provides project management observations and recommendations.

2.1 Summary

The execution of any large scale EPC project is a cross-functional task covering the entire range of these services plus more as covered in the contractual agreement(s). To ensure that that the range of services is fully integrated such that the project can be executed as efficiently as practical, it is incumbent upon the project management staff to plan, organize, direct, and control all facets of the project. As the Owners, SCE&G and Santee Cooper have the responsibilities to manage their portion of the prime contract and ensure that the Consortium contractors are fulfilling their contractual obligations.

In performing the project management assessment, Bechtel approached this project management function in two ways. Bechtel assessed how the Owners were managing their contractual responsibilities and secondly how the Consortium partners were managing their contractual obligations. Contractual documents were provided to Bechtel for the assessment; however, the contractual documents were redacted to a large extent. Bechtel was not provided any commercial terms associated with the prime contract agreement between the Owners and the Consortium. As a consequence and as regards any commercial terms between the Owner and the Consortium or between the Consortium partners, Bechtel was left to rely on information provided during management interviews, presentations, and attendance at daily, weekly, and monthly meetings.

2.2 Observations and Recommendations

Project management observations and recommendations are identified in Table 2-1.

Table 2-1. Project Management Observations and Recommendations

No.	Description
PM1	Observation(s) • The Consortium's project management approach does not provide appropriate visibility nor does it provide accuracy on project progress and performance. • There is a lack of accountability in various Owner and Consortium departments. • The Consortium's lack of project management integration (e.g., resolution of EPC issues) is a significant reason for the current construction installation challenges and project schedule delays. • The approach taken by the Owners does not allow for real-time, appropriate cost and schedule mitigation.

Table 2-1. Project Management Observations and Recommendations	
No.	**Description**
	Recommendation(s) • **(Priority 1)** Develop an Owners' Project Management Organization (PMO) and supplement current Owner staff with additional EPC-experienced personnel dedicated to the project that are empowered with the roles, responsibilities, and accountabilities for making the needed project-related decisions to keep the project on track. • **(Priority 2)** Assign recognized high-performing personnel to the current management personnel in WEC and CB&I (i.e., shadow positions) as part of a major improvement plan.
PM2	Observation(s) The WEC-CB&I relationship is strained, caused to a large extent by commercial issues (see last bullet of Executive Summary). Recommendation(s) • **(Other)** The Owners should take an active role in determining the reason(s) for the relationship and develop an action plan, including possible new contract terms, to fix the relationship.
PM3	Observation(s) The overall morale on the project is low. Recommendation(s) • **(Priority 1)** The Project needs to experience some successes, no matter how small. Publish and post scheduled activities for the coming months around the job site. Post activities that have a high likelihood of being completed within schedule. Reward those responsible for achieving success (i.e., make success contagious). • **(Priority 2)** Recognize individuals for their contributions to the project. For example, have an employee of the month from the various functions/various craft trades and publicly reward them. Rewards could include preferred parking for a month, gift certificates, etc.
PM4	Observation(s) • It appears that the Contract has created an imbalance between the Owners and the Consortium. The Consortium does not appear to be commercially motivated to meet Owner goals. • Engineering has not been completely responsive to Procurement and Construction requests for clarification and changes (e.g., timeliness, constructible designs); this is believed to be caused mostly by the commercial situation. • The Consortium's commercial structure, while not shared, is outwardly affecting the day-to-day working relationships between the Consortium partners and is creating performance issues, including significant non-manual turnover. Recommendation(s) • **(Priority 1)** Align commercial conditions with the project goals. • **(Priority 2)** Facilitate Owner and Consortium teambuilding. If necessary, replace personnel with others that share the goals developed by the project. • **(Priority 1)** Determine the realistic to-go forecast costs for the project completion, make adjustments/changes where necessary.

3. Engineering and Licensing

This section describes the assessment of the engineering and licensing aspects of the project. Section 3.1 provides a summary of the engineering status. Section 3.2 addresses current licensing status. Section 3.3 provides engineering and licensing observations and recommendations.

3.1 Engineering Current Status

There are approximately 15 to 18 months of sustained detailed design engineering to be completed by the Consortium for the AP1000 standard plant and the V.C. Summer site specific design. The majority of this engineering is scheduled to be completed by December 2016 based on the information contained in the WEC and CB&I to-go engineering completion schedules. Some of this design work is near term critical path to support procurement and construction (primarily civil and module work), while the balance is design work which must be completed to support fuel load.

Other significant engineering workloads include completing design engineering work needed for fuel load and startup, resolution of Engineering & Design Coordination Reports (E&DCRs), resolution of Non-Conformance and Disposition Reports (N&Ds), and vendor document reviews.

3.1.1 WEC Engineering

In general, WEC is responsible for performing detailed design engineering for the nuclear island (containment and auxiliary building) structures; the plant safety systems; ASME Class 1, 2 and 3 piping systems; and nuclear island structural, equipment, and piping modules. Turbine instrumentation and controls (I&C) are being designed by Toshiba for WEC. WEC also specifies and procures all standard plant valves.

WEC states that they completed their detailed design engineering for the U.S. AP1000 standard plant (V.C. Summer and Vogtle) in April 2015. Engineering complete is defined as Certified for Procurement and Construction (CFPC) or Issued for Construction (IFC). WEC has identified that approximately 4% of the design engineering has not yet been completed. This remaining engineering is referred to as “Engineering Debt” and it includes both the engineering that must be completed to support procurement and plant construction as well as the substantial other engineering activities needed for fuel load and startup. I&C design is also not completed and is not included in the to-go “debt” work scope. Design Deliverables (DDs) consist of construction and procurement drawings, documentation, and other “debt” reconciliation. Approximately 1,400 DDs remain to be completed. During the September 9, 2015 Consortium presentation, WEC stated that they were 94.3% design complete.

WEC’s major to-go design priorities to support construction are:

- Electrical tray, conduit, and supports design above El. 100’ in the auxiliary building.

- Civil design above El. 100' in the auxiliary building; C7 reinforcing steel El. 135' – El. 162' in the auxiliary building.
- A5/A6 floors in the auxiliary building.
- SPL18 and SPL51 floor modules design modifications based on China installation experience; this is about 20% review complete and the modified design is urgently needed by construction to support module fabrication and installation.

WEC detailed design engineering is being performed at its home office in Cranberry, PA, offices in Spain, and to a limited extent at the V.C. Summer and Vogtle sites and in other WEC offices. WEC has approximately 520 engineering personnel assigned to the AP1000 design engineering efforts, but only about 40 are located at the V.C. Summer site. Within the Cranberry engineering staff, WEC has established three "response teams" consisting of approximately 80 engineers dedicated to addressing emergent issues requiring engineering disposition or resolution. These teams are civil-electrical, modules, and mechanical. WEC is also planning to put in place a review board for electrical and piping to anticipate potential design changes and construction challenges and resolve these well in advance of the construction need date.

3.1.2 CB&I Engineering

In general, CB&I is responsible for performing detailed design engineering for the balance of plant including the turbine island, annex building, radwaste building, diesel generator building, service building, administration building, and site specific structures and systems. CB&I is also responsible for the design of approximately 45 systems, including ASME B31.1 piping systems and all cable routing and scheduling. CB&I is the design authority for the AP1000 standard plant balance of plant and site specific design work.

CB&I has not yet declared "Engineering Complete." The integrated project schedules showed August 31, 2015 as the "Engineering Complete" date. During the September 9, 2015 Consortium presentation, CB&I stated that they were 82.5% design complete.

CB&I's to-go standard plant ("1 x 4") and V.C. Summer site specific work is contained in its P6 to-go engineering schedule. A review of this schedule shows it to be comprehensive and it identifies interfaces with procurement, vendors, construction, and WEC engineering. CB&I's major to-go design priorities to support construction are:

- Chilled water system redesign, scheduled to be issued by December 2015
- Turbine drain and vent system redesign, scheduled to be issued by December 2015
- Annex building reinforcing steel design, being resolved by CB&I's Vogtle design team, common for V.C. Summer

- Main steam piping overdesign (main steam pipe wall thickness over-specified by WEC) – creating revised support designs and problems with the design of the main steam pipe anchor at the auxiliary building wall (stargate)
- ASME N-5 data reports, which are planned to be inserted into the construction schedule by the end of September 2015.

CB&I's detailed design engineering is being performed primarily onsite at V.C. Summer with support from the Vogtle site and CB&I's home office locations. CB&I has approximately 270 engineering personnel assigned to the AP1000 and site specific scope, of which 184 are located at V.C. Summer, 27 at Vogtle, and the remaining personnel in CB&I's Charlotte, NC, or Canton, MA, offices.

3.1.3 SCE&G Engineering

SCE&G provides engineering oversight of WEC and CB&I. This oversight includes the following generic items:

- Monthly schedule review and progress meetings
- E&DCR review (on a sampling basis)
- Review of major equipment N&Ds for "accept as is" or "repair"
- Review and input to departure evaluations and license amendment requests (LARs)
- ITAAC coordination and closure
- Review and approval of "upper tier" design documents, such as P&IDs and single lines.

As part of its efforts, SCE&G maintains close coordination with its Southern Company counterparts for Vogtle Units 3 & 4.

SCE&G engineering consists of 17 persons--the manager, 2 supervisors, and 14 engineers.

3.1.4 Control of Engineering Activities

WEC and CB&I hold a weekly engineering schedule update and interface meeting to status engineering progress. The ROYG report is reviewed and it identifies engineering activities that are impacting construction. A gap file report is also prepared to identify engineering and construction activity interface ties. SCE&G also holds monthly engineering completion status meetings with WEC and CB&I.

The design change control process being used by both WEC and CB&I consists of design change proposals (DCPs) and E&DCRs. Both are managed through a "stage gate" process. DCPs are

noted as “Class 1” and “Class 2” as are E&DCRs. Class 3 E&DCRs are not part of the stage gate process for design change control.

Both WEC and CB&I employ an engineering Finish It Now (eFIN) process in support of Construction. Emergent work is taking priority to DD completion within both the WEC and CB&I design organizations. WEC indicated that it expects changes (rework) to a few ASME pipe spools that have already been delivered to the site. Most of the changes (rework) are expected in ASME pipe supports resulting from changes in pipe support locations. Discussions with CB&I electrical field engineers and superintendents indicate that there may be similar rework issues with WEC electrical cable tray support designs due to design complexity.

3.1.5 Post-Detailed Design Engineering Closure Plan

Beyond completing the detailed design needed for construction, there remains a significant amount of engineering that must be performed to support fuel load and startup. This primarily involves the design engineering work performed by WEC, and to a lesser degree the work performed by CB&I. These activities and programs must be completed to support preoperational testing, startup, and system turnover for fuel load and power ascension testing and include:

- Final nuclear steam supply system (NSSS) safety analyses for as-built conditions, including small break and large break loss-of-coolant accident analyses
- ASME pipe stress and pipe support as-built reconciliation
- Structural adequacy evaluation for Category I structures
- Containment structural integrity and containment integrated leak rate test programs (including engineering acceptance criteria)
- Hot functional and vibration monitoring test program (including engineering acceptance criteria)
- Class 1 stress reports (components and piping)
- Engineering support to component testing and pre-operational testing and startup
- Engineering document/record turnover to the Owner

This work needs to be fully scoped, resource-loaded, and scheduled in the P6 integrated project schedule with appropriate ties to construction and startup program activities. Based on a review of the current schedule, the Consortium has not started this planning effort.

3.1.6 Design Change Control and Emergent Design Engineering Work Scope

Because of design complexity, particularly reinforcing bar design and spacing tolerance requirements, structural module fabrication in offsite and onsite fabrication shops is requiring a

significant amount of E&DCRs to be reviewed and dispositioned by engineering to modify issued designs to be more constructible. This trend will continue as construction moves to the installation of piping, cable tray, conduit, HVAC, and equipment/components, especially with the supports for these items owing to the complexity of design that has been identified in advance by construction personnel.

The number of issues identified during the current civil phase of the construction effort is significant. These issues have been identified during the erection of the nuclear island and turbine island structures which comprise reinforced concrete basemats, exterior and interior walls, as well as the auxiliary building and several major steel composite structural modules in the containment. Current data shows that from May to September 2015 there is a trend of more E&DCRs being initiated (requests made) than are being closed (approved/dispositioned). This data shows that current E&DCR backlog work is not being worked off and indicates that a continued focus and possible increase in staffing is required:

Responsible Company	Average Initiated	Average Closed	Open at End of September 2015
WEC	~85	~71	~78
CB&I	161	149	60

The incorporation of E&DCRs into the parent document is tracked and status data is provided in typical engineering design completion (EDC) dashboards (as seen in the Tuesday site POD meeting data). The data in the September 15, 2015 POD showed E&DCR incorporation is behind (shown with status “red” for 3 of 4 categories).

E&DCR response support has the potential to pull resources from other ongoing design completion efforts and negatively impact emergent construction needs if timely responses are not provided. The incorporation of approved E&DCRs into the parent document will be a resource demand, but failing to timely incorporate E&DCRs into parent documents will violate procedures and provide a potential error trap of multiple changes against work being planned and implemented.

3.1.7 Non-Conformance and Disposition Reports

N&Ds require design engineering support for disposition approvals and assessment of impacts to issued design for dispositions of “repair” and “use as is”. This disposition concurrence is an emergent activity that is usually a high priority to support construction.

N&Ds are tracked and summaries are provided in various reports. The Thursday POD report has both WEC and CB&I open N&D reports by age. The September 24, 2015 POD showed 183 N&Ds open for WEC action and 477 N&Ds open for CB&I action. The October 1, 2015 POD showed 183 N&Ds for WEC action and 328 N&Ds open for CB&I action. (Note: The CB&I action includes both design and field engineering actions as the data split between groups was not readily available.)

N&D response support has the potential to pull resources from other ongoing design completion efforts to support the emergent construction needs.

3.1.8 Vendor Document Review and Approval

It was identified that WEC has approximately 35,000 remaining vendor documents to review and approve and that CB&I has approximately 100,000 vendor documents yet to approve. Procurement engineering has the responsibility for reviewing and approving these documents.

3.1.9 Technical Engineering Issues

Two significant issues that the Consortium engineering groups are working on include tube steel wall thickness and equipment preservation:

- **Tube Steel Wall Thickness (Hollow Structural Shapes)**. The site has identified that there is an industry-wide issue with the fabrication of cold-formed welded and seamless tube steel structural shapes. The manufacturing process for A500 structural tube shapes creates wall thicknesses less than that required by the ASTM material specification. WEC and CB&I are working together to address a plan that will allow the use of this material at both Vogtle and V.C. Summer.
- **Equipment Preservation**. Early site delivery of equipment and components, coupled with ongoing construction schedule delays, is creating several problems. The original equipment specifications specified preventative maintenance or on-site storage requirements typical for “normal” time between site delivery and installation in the plant. Engineering is now updating equipment specifications so that purchasing/procurement can contact suppliers to request them to provide updated preventative maintenance or storage requirements necessary for a longer storage period between site delivery and plant installation/equipment operation. It is unknown whether any equipment has degraded to the point where it must be replaced, and it is unknown whether equipment and component warranties are impacted.

Further, the Consortium has compiled a listing of major risks to project completion extracted from the project risk register. From an engineering perspective, the major risks include:

- Reactor coolant pump issues
- Coupler weld issues
- Passive core cooling system issues
- Auxiliary building wall 11 changes
- Reactor coolant system/steam generator system transient analysis
- Generic Safety Issue 191 cable debris issue

- Motor and air operated valve operational setup sheets

The Consortium should endeavor to address and resolve these risks to minimize project impacts.

3.2 Licensing Current Status

The V.C. Summer licensing effort appears to be well organized and staffed by personnel with extensive experience with the AP1000 Design Control Document (DCD), the V.C. Summer (and Vogtle) Combined License Applications (COLAs), and interactions with the NRC.

3.2.1 Licensing Staffing

SCE&G manages the overall licensing program for V.C. Summer and they work closely with the licensing and engineering personnel from Southern Company for the Vogtle project. WEC manages the Consortium's licensing efforts.

There are 14 personnel in the SCE&G licensing group. 5 persons handle LARs and departures. The rest of the group handles NRC inspections, other permits, Final Safety Analysis Report (FSAR) update, the 10 CFR 52 change process, and operating programs.

The WEC licensing organization currently has 9 personnel at the site. Four of these personnel are working on licensing issues and 5 are dedicated to the closure of Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC). The number of ITAAC personnel is expected to increase to 10.

In the Cranberry offices, WEC has one director, 3 supervisors, and 22 engineers working on LARs, departures, and regulatory issues.

CB&I has 2 licensing personnel assigned at the site and 1 manager in Charlotte.

3.2.2 License Amendment Requests and Departures

Currently there are 120 LARs and 657 departures. The breakdown of LARs is as follows:

35	WEC LARs approved by the NRC
2	SCE&G LARs approved by the NRC
18	LARs submitted to the NRC, but not yet approved
63	Not yet submitted to the NRC
2	Vogtle only
120	Total

Known LARs appear to be well in hand with detailed schedules developed for each LAR. There are active and continuous interactions with the NRC on each LAR and the NRC is working to meet

construction need dates. The schedules for LAR 30 and 111 were reviewed and they include a good breakdown of schedule activities and durations for these LARs.

The Consortium is tracking their schedule and quality metrics for licensing change packages and improvements have been seen in both areas.

SCE&G Licensing is working to improve the turnaround time for incorporating LARs and departures into the integrated FSAR. At the time of the assessment, 1 approved LAR and 108 approved departures had not been incorporated. Formal revisions to the FSAR are issued every 6 months.

Various LARs have represented significant project challenges since the start of safety-related construction including:

LARs 54, 55	Basemat ACI-349 shear reinforcement (February 2013)
LAR 60	Auxiliary building structural floors (July 2014)
LAR 72	CA01 module anchor and CA05 (March 2015)
LAR 78	CA04 tolerance change (August 2015)
LARs 110, 111	AWS D1.1-2000 (September 2015 and TBD)
LAR 30	Remove MSIV compartment vents and change penetration rebar design/turbine bay wall 11.2 tornado missiles (TBD)

The Consortium identifies the possibility of emergent LARs as one of the project's significant risks. These are LARs (like the recent LAR on CA22 rebar) that are discovered late and have the potential for impacting construction work progress. The various tight tolerances identified in DCD Tier 1, Table 3.3-1, "Definition of Wall Thicknesses for Nuclear Island Buildings, Turbine Building, and Annex Building" are a continuing concern with the civil construction work underway. And, as the number of construction work fronts expands, the potential for identifying emergent LARs (and departures) may increase.

3.2.3 ITAAC

There are 873 ITAAC that must be closed for each unit. Thirteen (13) of the ITAAC have been closed (about 1.5%).

An ITAAC schedule has been developed that includes the closure activities for each ITAAC. The schedule is a good tool to track the efforts for ITAAC closure. Periodic ITAAC schedule reports are also submitted to the NRC.

All ITAACs must be closed by fuel load. This will be a significant challenge requiring substantial efforts by the engineering and licensing organizations in the late stages of the construction effort.

The current schedule shows a peak of almost 120 ITAAC closures in January 2018 and over 90 in June 2018.

ITAAC performance and documentation plans have been prepared for each ITAAC. Several examples were reviewed during the assessment:

- APP-RNS-ITH-004, Standard Plant ITAAC 2.3 06.09b.iv
- APP-PCS-ITH-014, Standard Plant ITAAC 2.2 02.02a
- APP-RCS-ITH-048, Standard Plant ITAAC 2.1 02.11b.iii
- APP-RCS-ITH-056, Standard Plant ITAAC 2.1 02.08b
- APP-RCS-ITH-060, Standard Plant ITAAC 2.1 02.08d.vii

These plans appear to be complete and identify the responsible organizations, ITAAC wording, supporting documents, and the ITAAC performance and documentation plan. The plans include the logic for ITAAC performance, deliverables to support ITAAC submittal, personnel identification/ assignment, materials or instrumentation procurement needed, vendor support needed, and the schedule for performance (including schedule activities in the integrated project schedule). A draft of the ITAAC closure letter is also included in the plan.

SCE&G and Southern Company have recently met with the NRC to discuss the concept of Early Uncompleted ITAAC Notification (UIN). The UIN concept of getting early NRC agreement on planned actions for later verification when completed could help with the high number of ITAAC closures at the end of the construction effort.

Public involvement or intervention in the ITAAC closure process is considered a project risk, although the potential for intervention is viewed as limited based on the specific 10 CFR 52.103 criteria.

The Consortium has identified delivered equipment conformance to ITAAC requirements as one of the project's significant risks.

3.3 Observations and Recommendations

Engineering observations and recommendations are identified in Table 3-1.

Table 3-1. Engineering Observations and Recommendations

No.	Description
E1	Observation(s) • Numerous E&DCRs are being created, processed, and implemented due to incomplete design or to resolve constructability issues. • Based on the team's observations of current civil work, the issued design is often not con-

Table 3-1. Engineering Observations and Recommendations	
No.	**Description**
	structible (currently averaging over 600 changes per month). The complexity of the engineering design has resulted in a significant number of changes to make the design constructible. • The forecast and scheduled/work-off plan is unclear with respect to E&DCRs. Recommendation(s) • **(Priority 1)** Initiate a focused effort to complete known design "debt" to assist construction planning and to eliminate one source of E&DCRs. • **(Priority 1)** Establish a forecast based on historical data and staff on a level of effort basis to support. Provide additional staffing to address emergent E&DCRs and work off the current backlog. Adjust the make-up of the team expertise (civil, piping, electrical, etc.) to support the different stages of construction. • **(Priority 1)** Locate dedicated WEC engineering response teams to the site with design authority to resolve E&DCR issues. • **(Priority 2)** Establish a WEC/CB&I "light structures" design organization at the site to work with construction to redesign and reissue piping, HVAC, conduit, and tray supports that have been identified as difficult or impossible to construct (in advance of the construction need date), and to support the design of field run commodities such and conduit and instrumentation tubing that have yet to be installed.
E2	Observation(s) • The work package data prepared by field engineering is checked for content accuracy and completeness in accordance with CB&I procedures NCSP 2-19, NCSP 2-12, NCSP 2-7, and CSI 2-19. All of the required information is then placed into a binder(s) and sent to document control, who then manages the daily sign out, sign in of the work package by the craft. In some instances, the work package is in three binders – instructions, engineering drawings, and E&DCRs (change paper not yet incorporated into the parent drawings). • Simplification of the entire work package is desired, and it was identified that a task force was being assembled to figure out how to make the process simpler and streamline the work package physical size. • Approximately 2,000 work packages have been written to date; 800 of these are closed; 1,200 in some state of being worked, 100-200 are checked out from document control daily, and 18,500 to 24,000 total are expected to be written for Units 2 and 3. Recommendation(s) • **(Priority 1)** Use a Six Sigma approach to simplify the size and content of the work package. • **(Other)** Strictly enforce within WEC and CB&I design engineering that no more than four change papers against a design drawing may exist before they must be incorporated into the parent document for re-issue to construction.
E3	Observation(s) During an October 13, 2015 visit to the Unit 2 containment document control drawing annex, more than several drawings were identified as being annotated with 10 or more changes. Document control personnel had previously indicated that per plant requirements, drawings should be revised after four (4) changes. In an unscientific sampling of ten (10) drawings, four (4) were found to exceed four (4) changes with one containing 33 active changes. The potential impacts of excessive changes to existing drawing revisions include the additional time burden

Table 3-1. Engineering Observations and Recommendations	
No.	**Description**
	on field personnel performing work using the drawings and document control personnel maintaining the drawings. Additionally, it complicates the ability of field workers to verify that work is being performed to the latest approved drawing. Recommendation(s) • **(Other)** Review current processes and resources to determine why plant drawing revision requirements are not being met. Based on the results, revise process and/or add resources to ensure that engineering drawings are revised in a timely manner.
E4	Observation(s) • Numerous late (just prior to or during installation) N&Ds to document installation issues are being created, processed, and implemented to support supplier or constructability issues. • The forecast and scheduled/work-off plan was unclear to the assessment team with respect to N&Ds. • There appears to be inadequate coordination between construction, field engineering, and design engineering on preliminary and final disposition N&Ds. Recommendation(s) • **(Priority 2)** Initiate a focused effort on planning and review of design, vendor/contractor documents and tolerances to eliminate or have early identification of N&Ds. • **(Priority 2)** Establish a forecast based on historical data and staff on a level of effort basis to support. Adjust the make-up of the team expertise (civil, piping, electrical, etc.) to support the different stages of construction. • **(Priority 2)** Create/revise the process to enhance coordination between construction, field engineering, and design engineering for N&Ds.
E5	Observation(s) • The Strategic Planning Group reviews electrical, piping, and I&C for everything but yard work. The deliverables from this group includes a “room plan” and the goal is to perform this review approximately 6-9 months in advance of when the work is scheduled; to identify all the things that must be installed in a room prior to the room ceiling being installed. The group has a staff of 14. • Review priority is set by construction. Approximately 3,000 work packages have been scoped (electrical and piping only) and approximately 100 have been planned electronically (several more were recently reviewed with the assessment team). Not much electrical design has been completed and issued for construction to be available and that which is issued is considered problematic in many cases. • Pipe supports seem overly complicated; in containment electrical supports are “box beams”; room plan being developed to support the boundary information package (BIP) to support system turnover. Recommendation(s) • **(Priority 2)** The standard plant 3D model should be updated so that it accurately reflects the final design so that it will better support understanding what is in a room that must be constructed. • **(Priority 2)** If possible, the 3D model should be put under configuration control so that images

Table 3-1. Engineering Observations and Recommendations	
No.	**Description**
	and data drawn from it can be relied on. • **(Priority 2)** E&DCRs and N&Ds should be rolled into design drawings and the 3D model to reduce the potential for human error in missing a requirement shown on these change documents.
E6	Observation(s) • Several significant problem areas are being actively worked to resolution: — Chilled water system. Redesign is in progress and will be resolved by December 2015. — Turbine drain and vent system. Redesign is in progress and will be resolved by December 2015. — Annex building reinforcing steel. This issue is being resolved at Vogtle. — Main steam piping (WEC inside auxiliary building; CB&I outside auxiliary building). WEC over-specified the main steam pipe wall thickness. This resulted in a new stress analysis that shows supports overloaded and being redesigned (thicker pipe equals more weight than originally analyzed); created a major problem with the main steam pipe anchor at the auxiliary building wall (stargate). • Equipment preservation is requiring engineering to revise specifications and go back to vendors to obtain new vendor submittals for equipment preservation requirements not originally anticipated to be required (because equipment is being delivered to the site well in advance of the construction need dates and construction need dates have slipped (compounding the problem). Recommendation(s) • **(Other)** Assess the practicality of buying new main steam pipe with the correct wall thickness rather than performing counter boring operations in the field and redesign of the stargate anchor, which may require changes to a 'special processes' specification or manual. • **(Priority 1)** Evaluate if equipment site delivery can be delayed to minimize field equipment protection problems prior to installation in the plant.
E7	Observation(s) • An E&DCR is required for all changes, including software (e.g., calculation revision). • WEC performed an E&DCR study for the period May 15 – August 15, 2015. E&DCRs were classified as home office issues (unsolicited change), construction impact, and exceptions. A new study covering August 15 – December 15, 2015 is in progress. • Work package planning (6 months in advance of construction) can identify issues requiring resolution. WEC is part of the new site Strategic Planning Group. • The construction planning and constructability review efforts are not far enough out in front of the construction effort to minimize impacts. Recommendation(s) • **(Priority 1)** Intensify the efforts of the Strategic Planning Group, work package planning, constructability reviews, etc. to identify design changes needed well in advance of the construction need date. • **(Priority 1)** Look-ahead beyond where construction is today and work with the site Strategic

Table 3-1. Engineering Observations and Recommendations	
No.	**Description**
	Planning Group to roll in E&DCRs for all design documents associated with the room being planned, so that the room plan deliverable has the most up to date design documents.
E8	Observation(s) • The two major design areas yet to be issued are electrical and civil: — Electrical – above El. 100' in the auxiliary building (trays and conduit). — Civil – above El, 100' in the auxiliary building – C7 reinforcing steel release; CA50 modules; A5 (El. 135') and A6 (El. 117') floors (embeds for as-procured commodities); floor modules SPL18 and SPL51 – China experience – reviewing first 20% of changes and categorizing as "must have"; a simplification design package for "must haves" to be issued by WEC (in schedule). Recommendation(s) • **(Priority 1)** Place emphasis on getting these new designs completed and associated drawings issued as soon as possible to construction/procurement. • **(Priority 1)** Conduct a constructability review meeting with construction prior to issue in order to avoid the need for changes.
E9	Observation(s) • The resolution of open items and emergent site issues is shared with Vogtle for standard plant (1 x 4) designs. • WEC has three (3) dedicated response teams in Cranberry to address emergent issues – civil-electrical, modules, mechanical. Includes about 80 engineers (doubled in size since the April 30, 2015 design complete declaration). • Post-Engineering Design Closure Plan – includes items such as hot functional testing plan, startup support, piping and supports as-built reconciliation, document turnover program, etc. WEC is identifying and verify this emergent work now. These activities will be added to the schedule, resource loaded, and tied to construction/startup/fuel load. • Domestic hold removal is tracked and statused weekly. These are tied to construction need dates and consist of holds on design drawings that must be released so that construction can proceed with the work identified within the hold. These are reviewed weekly with project controls and statused weekly on a dashboard. • The EDC dashboard shows an increase in "Approved DCPs/Doc Pairs" requiring closure over the past several weeks with most coming from civil, which is indicative of the current major construction work front. • A weekly four hour meeting is held with engineering to review/status the to-go schedule and the above items. Recommendation(s) • **(Priority 1)** WEC engineering should continue to stay on top of emergent issues including maintaining focus on the increase in Approved DCPs/Doc Pairs requiring closure. • **(Priority 1)** Add appropriate staff to work off the backlog of approximately 1,150 of 1,400 items identified on the September 14, 2015 dashboard. • **(Priority 2)** Complete the identification and resource loading of the post-engineering design closure plan and load activities/resources into the P6 schedule. Assess changes to staffing that may be required to support this work.

Table 3-1. Engineering Observations and Recommendations	
No.	**Description**
	• **(Other)** The weekly four hour engineering schedule meeting is a good practice and should continue.
E10	Observation(s) • The Strategic Planning Group was recently formed to review and prepare a room plan which, at a high level, identifies all the construction work required to be completed in a given plant room, and a general sequence of installation of the commodities within the room. The room plan review is planned to be performed approximately 6 to 9 months in advance of the construction start date for the room/area. • Operating procedures for the Strategic Planning Group have been approved. The current staff is 14. • The effort identifies only electrical, piping, I&C, and modules work for a given room. No material quantity takeoffs or yard work planning is included. Field engineering does all other construction planning. • The priority of room plan development is set by construction. • The room plan process came into existence because of the difficulty of pulling together all of the design drawings for all commodities required to be installed in a room, coupled with trying to comply with issued/approved but not incorporated change paper (E&DCRs). • The room plan deliverable is input to work package planning that is performed by the central planning group which is newly formed and has a staff of 28. • Approximately 3,000 work packages (electrical, mechanical) have been scoped. Approximately 100 rooms planned to date (electronically). • Work packages are being made smaller and reasonably scoped through interactions with CB&I construction; prepared by commodity (e.g., piping, pipe support, electrical, etc.). • Preliminary findings in the room plans are that piping and electrical tray supports are complicated and congested and will be a significant challenge to install. This could result in a significant amount of emergent E&DCRs and N&Ds similar to the civil design problems. • Work packages are being scoped to be consistent with the startup boundary information plans so that they support system turnover to the pre-op test group. • The 3D model is used but it is not up to date; commodity clashes (intersections) are seen and noted. • Piping and electrical support locations cannot be easily tied to civil drawing baseplates. This requires a lot of research to figure out. Indications are that electrical may also be an issue. • Supplemental (miscellaneous) steel to support pipe and tray supports is not yet designed which results in change paper to get it fabricated and installed. • Two-inch diameter and under conduit/piping is field routed. Recommendation(s) • **(Priority 1)** Engineering should get ahead of construction and get E&DCRs incorporated into design drawings so that construction planning is simplified and takes less time. • **(Priority 1)** A construction priority should be work package closure. • **(Priority 1)** The Strategic Planning Group function should continue because of the issues that have been identified to date with the engineering design drawings. • **(Priority 2)** Set up in the field a design engineering “light structures” group to facilitate field

Table 3-1. Engineering Observations and Recommendations	
No.	**Description**
	walkdowns to support preparing designs for 2" diameter and under support designs, and issue the design drawings.
E11	Observation(s) Based on discussions with SCE&G engineering and licensing personnel: • SCE&G does not believe WEC engineering is ahead of construction. • WEC has limited civil/structural resources in their Cranberry office to deal with the civil licensing issues and is not as knowledgeable of ACI 349 as the NRC. • SCE&G believes there will be more emergent civil issues, e.g., construction tolerances. • The piping Design Acceptance Criteria (DAC) ITAAC may become a potential problem area. The Consortium has to inform the NRC when piping stress analyses are complete so that NRC can inspect them. • SCE&G expects problems with digital I&C. Recommendation(s) • **(Other)** No specific recommendations.
E12	Observation(s) • Module design was not complete at time of contract execution. The change from A36 to A572 steel created fabrication issues. • "As assembled" final module tolerances are driven by ITAAC requirements. Fabrication tolerances had to be tighter to meet 'as assembled" tolerances. • Different tolerances are specified for different modules. • Fabricators are finding design errors. • Some large mechanical modules are complex and not yet fabricated. • The WEC site team supports onsite module work. WEC Cranberry supports in shop module fabrication. Recommendation(s) • **(Other)** Correctly sequence the placement of mechanical and floor modules into Unit 3 CA20 and CA01 modules prior to installing them in the unit.
E13	Observation(s) A significant number (greater than 1,000) WEC drawing holds exist that are impeding procurement and construction activities. Recommendation(s) • **(Priority 1)** As part of the weekly schedule update meeting, review near term holds and commit to getting a release date for hold removal and document issue to support procurement and construction work.
E14	Observation(s) • The to-go WEC engineering schedule comprises roughly 75-85% activities that are 'software' only; i.e., closing out corrective actions, rolling in outstanding E&DCRs, archiving calculations, etc., most of which is required to support fuel load, not the day-to-day construction work. • The Post-Engineering Design Closure Plan is meant to be that engineering work necessary to get the plant to fuel load, but is not necessarily tied to immediate construction work; e.g., hot

Table 3-1. Engineering Observations and Recommendations	
No.	**Description**
	functional testing plan, SIT/ILRT testing plan, engineering support to startup; piping and supports as-built reconciliation; structural adequacy evaluation, document turnover to the Owner, etc. WEC is working to develop the work scope, schedule, and resources required for completing or supporting these activities. Recommendation(s) • **(Priority 1)** Continue with the weekly schedule review meetings to ensure these engineering activities are getting completed in addition to supporting emergent site issues and completing any unfinished to-go design engineering. • **(Priority 2)** Assemble a team of subject matter experts to develop the work scope, schedule activities, and resource requirements for Post-Engineering Design Closure. This will enable determination of the need to add resources later in the project or to reassign personnel to support these work activities.
E15	Observation(s) Personnel assigned to the onsite document control team are working significant overtime. Two document control staff persons were recently added and an additional member may be added in the near future. The document control team is challenged with the volume of work necessary to support work packages and drawing maintenance. Recommendation(s) • **(Other)** Perform a review that leverages the experience of current team members who have worked other commercial nuclear sites and develop a “best in class” approach to document control. Alter work processes to incorporate the things that worked well at other locations and avoid the mistakes that may have occurred elsewhere. Encourage a questioning attitude among team members that allows the question, “why are we doing this?” to be asked of all phases of the document control process. • **(Other)** Implement the use of bar coding to reduce the amount of time craft personnel spend in retrieving and submitting work packages.
E16	Observation(s) • Based on discussions, site document control has a challenging task to meet existing work package demands, though, from discussion, it appears that electronic processes do assist in package processing and production/reproduction. Document control is staffed with fourteen (14) workers, providing coverage 24 hours per day for six (6) days each week, with staff on call for Sunday work. • The work control process places a significant administrative burden on those developing, maintaining, and administering work packages. Field work portions of the packages contain numerous sign offs, requirements for shift work accomplishments to be documented, etc. These requirements begin once a package has been picked up from document control at the beginning of a shift, transported to the work site, pre-job brief performed, and work allowed to begin. At the end of shift, the package is returned to document control, where entries/updates provided during the shift are documented. The next shift continues the process when the shift representative picks up the package to begin the next phase of work.

Table 3-1. Engineering Observations and Recommendations	
No.	**Description**
	Recommendation(s) • **(Priority 1)** Continue the cross functional team identified by the Consortium that is tasked to review the work control process (including document control) and include consideration of the following items: — Reducing the volume of paper in work packages — Minimizing worker entries to those absolutely necessary to document work performed — Implementing alternative means of making worker entries (electronic tools) — Performing field assessments of work package activities to include worker/foreman feedback/suggestions — Eliminating documentation not specifically needed in the field for workers to perform work — Developing work packages for smaller, more discrete work scope.

4. Procurement

This section describes the assessment of the procurement aspects of the project. Section 4.1 provides a summary of the current status. Section 4.2 provides procurement observations and recommendations.

4.1 Current Status

The project is supported from a procurement perspective by CB&I and WEC, with CB&I's efforts supported both onsite and in their Charlotte, NC offices and WEC supported by their Cranberry, PA offices.

The project procurement teams are focused on the to-go purchases and material deliveries as reported via the ROYG report and discussions with site personnel. The September 28, 2015 ROYG report provides the following information regarding the to-go purchases and the delivery status of components tied back to the schedule:

Category	WEC Remaining POs to be Placed	WEC Remaining Equipment Delivery	CB&I Remaining POs to be Placed	CB&I Remaining Equipment Delivery
Red	6	54	17	1,159
Orange	2	29	7	218
Yellow	1	27	1	143
Green	22	347	0	1,387
N/A	--	--	2	0
Total	**31**	**457**	**28**	**2,907**

Currently, the procurement portions of the ROYG report do not accurately reflect the project's current requirements or needs. Bechtel' ability to properly assess the impact of the above data in relation to the project critical path was hindered because CB&I was completing a schedule adherence project. This effort, scheduled for completion by October 31, 2015, is planned to result in changes to the ROYG report to properly identify material requirements that do not support the project schedule. Once these changes are identified, the Consortium plans to implement mitigation plans to resolve identified problem areas.

CB&I site procurement is focusing on several efforts which are of importance and in various stages of completion:

- Establishing and fully implementing a min/max strategy and program that supports construction needs. There are eight permanent plant material blanket purchase orders (BPOs) in place and an additional 16 in process with forecasted awards dates. Coordination with construction is needed such that identification of material(s) is made so that BPOs can be put in place with appropriate min/max levels established based upon

construction's requirements and usage rates and supply lead times. This is key to implement an effective program that supports the project's daily requirements.

- Inventory validation of material under the control of CB&I procurement, which currently has a 48% level of accuracy.
- Warehouse and laydown area availability and proper utilization.
- Commercial grade dedication (CGD) program implementation and adherence.

Overall, the current Consortium procurement program has the basic procedures and processes in place to complete the work. There are, however, areas for improvement and potential risks that are identified in the sections below.

4.1.1 Supply Chain Commitment and Support

Industry-wide, the nuclear supply chain continues to be in a period of restart and growing pains. Although the Consortium has nuclear quality programs in place, they are still adjusting to the existing and new regulations and documentation requirements. There has been a learning curve that is still in progress. The challenge is to keep the supply base in such a form as they can be profitable and provide a product or service at a competitive price.

The Consortium is challenged with the amount of design changes and documentation, which has presented commercial issues that have to be dealt with and resolved. The Consortium must be cognizant of and sensitive to supply chain issues, as they need to see that nuclear power requirements will not negatively impact their ability to do business.

4.1.2 Commercial Grade Dedication

Commercial grade dedication (CGD) is an accepted and necessary element of the nuclear supply chain. The issue is compliance with the requirements and the supply chain's understanding of their responsibilities as conveyed in the commercial agreement between the project and a given supplier or contractor. Additionally, the conveyance of project specific requirements is critical to the proper implementation.

There have been concerns with the proper conveyance of project requirements to the supply chain and their understanding of the project's needs. On the Consortium side, it was conveyed that there was a lack of understanding of the CGD process and management thereof. This was evident in the supply of safety related fabricated embeds. These concerns have been identified and are being addressed, with the result being improved awareness of project requirements by the suppliers and applicable project personnel. The key point here is the need for Consortium and supplier personnel to fully understand the CGD requirements and processes. There must be continued focus with this effort for the timely delivery of material and equipment to the project in accordance with construction need dates.

4.1.3 Preventative Maintenance Program

The implementation of and adherence to a robust preventative maintenance program is critical to achieving schedule compliance. With equipment and material deliveries currently onsite and not being issued to construction, the required preventative maintenance must be conducted and properly managed. This is a recognized concern and is being addressed by the construction and procurement departments. The focus and timeliness of adherence to programmatic requirements must be enhanced. It was observed and recognized by the CB&I procurement team that attention to this process was lacking and that the project needs to dedicate the resources accordingly. For material to be in support of the construction need date, it must be in compliance with both the technical requirements as per the purchase specification and the supplier-recommended maintenance program. If these are not followed, the construction need dates may not be met due to required repairs or complete replacements. Thus, preventative measures must be scrupulously followed to ensure that the schedule is not affected.

4.1.4 Documentation

The required documentation (certification packages with shipments), as it relates to the material supply, is one of the key elements of the final turnover package to the Owner for permanent plant retention. In discussions with the CB&I procurement team, it was described how errors are continuing to be identified in the required certification paperwork. These errors should have been caught either by the supplier or the CB&I inspector reviewing the packages prior to shipment. It is critical that the supply chain and CB&I assigned personnel fully understand this requirement and comply, since the lack of proper turnover documentation can adversely affect the schedule. Further, the project's prompt review of received documentation is critical, because if there are issues with it, they need to be raised and resolved immediately so that the material can be released in support of the schedule.

4.1.5 Storage Facilities

Currently, the site conditions are such that there is insufficient space to properly receive, store, maintain, and manage material. There is a program in place to evaluate this issue, and efforts are underway to expand and manage the outcome. There must to be a concerted effort to complete this effort so that the material management process can become more efficient and timely to constriction needs. Additionally, if material cannot be maintained, stored, and located for issuance in a timely manner schedule will be affected.

4.2 Observations and Recommendations

Procurement observations and recommendations are identified in Table 4-1.

Table 4-1. Procurement Observations and Recommendations	
No.	**Description**
P1	Observation(s) • Observed the need for an enhanced level of communication, so that the site organization knows the detail of deliveries and issues associated with 1x4 material/equipment and module procurements as there are issues that have to be addressed and communicated accordingly. There are multiple meetings at the site in which materials are discussed. Proper and accurate status must be conveyed. • Additionally, from a material management and storage perspective, the status and specifics of deliveries and site need are required due to the limitations of on-site storage. Recommendation(s) • **(Other)** Improve the process of conveying status and associated details of issues such that sufficient details are known and can be properly conveyed. • **(Other)** Establish a coordination meeting for procurement only so that there is a coordinated effort between site and Charlotte procurement activities.
P2	Observation(s) • During multiple walks and drives through of the warehouses, tents, and laydown areas, it is evident that there is insufficient space for level C and D storage. Specifically, there are 38 +/- floats with pipe spools that require the receipt process completed as there are storage issues. • There are currently 16 different locations covering both on and off site storage which are quite spread out over the project site. Additionally, material is being held at the multiple suppliers as there is no place to store at site. Recommendation(s) • **(Priority 1)** Complete a needs analysis to identify and finalize the required space. • **(Priority 1)** Perform a comprehensive manufacturing schedule review against construction need dates and deliveries forecasted for the next 6 months. Work with the supply chain as appropriate to delay manufacture to allow for future shipment at the appropriate time. • **(Priority 1)** Prioritize issues with Level C storage requirements.
P3	Observation(s) During the review of laydown and warehouse areas, it was stated that there was material no longer usable or needed due to design changes, particularly rebar and pipe spools. There is a delay in the process of identifying what material is no longer required and its appropriate disposition, leading to an ineffective allocation of space. Recommendation(s) • **(Other)** Expedite the finalization of the surplus process and implement it quickly so that space can be reallocated to incoming material. • **(Other)** Consortium management must drive this priority activity, along with Owner input, since space is at a premium.
P4	Observation(s) During multiple walk-throughs of the site laydown yards, there is a mix of material within the yards instead of having a program of commodity management by yard. This lends itself to inefficient material handling for a given work package. Having material in multiple locations can result in double handling and present challenges to basic material management.

Table 4-1. Procurement Observations and Recommendations	
No.	**Description**
	Recommendation(s) • **(Other)** Recognizing that this will be a significant time, resource, and logistical issue, work to reorganize the laydown yards with a focus on incoming material. Work towards staging by commodity and, where it makes sense, by work package.
P5	Observation(s) • Inventory validation is currently at a 48% accuracy level. This level of inventory control lends itself to not knowing where material is or what is in stock, resulting in the withdrawal process being time consuming. • Further, for bulk type items, construction doesn't know what's on hand; thus, their ability to plan is hindered. It was evident that with the current situation, material is just reordered as it is not known if it was onsite, used, etc. Recommendation(s) • **(Priority 1)** Complete the inventory revalidation effort which is planned for completion by the end of 2015. • **(Priority 1)** Establish a program to continually validate inventory.
P6	Observation(s) • During multiple walk-throughs of the CB&I laydown yards, the majority of pipe spools for identification purposes have paper tags rather than metal tags. It was observed that with the time material is held in laydown yards the paper tags have deteriorated or detached. • It was observed that some radio frequency identification (RFID) tags have also become detached. It was conveyed that, with the extended storage durations, they are experiencing failure of the RFIDs, which necessitates their replacement. Consequently, material identification and location is problematic. Recommendation(s) • **(Priority 2)** For material currently in CB&I's control, as part of the re-inventory process, create and attach new tags. Use weather resistant type tags that can be printed onsite. • **(Priority 2)** For future shipments, CB&I Laurens must use and attach metal tags instead of paper. It is assumed that a specification change will be needed to facilitate this new method of identification. • **(Priority 2)** As part of the re-inventory process, validate RFID operability and change accordingly if required.
P7	Observation(s)] In regards to material management and associated preventative maintenance requirements, it was observed that with the extended storage period for material in the onsite laydown yards and warehouses, there are deficiencies with the management and the administration of that process and the need for additional focus in this area. With the lack of proper management, i.e. maintenance, there is the risk that if material has to be replaced for whatever reason, there is the potential for a schedule issue since the replacement lead time may not support the schedule. Recommendation(s) • **(Priority 2)** Enhance the material storage program such that it is properly monitored and maintained as a joint effort between procurement and construction.

Table 4-1. Procurement Observations and Recommendations	
No.	**Description**
	• **(Priority 1)** Reconfirm that all items requiring maintenance are properly included in the material storage program. • **(Priority 2)** Identify and disposition items that have issues/problems quickly so that if replacement or repair is required, the replacement properly supports the schedule.
P8	Observation(s) • There is a material management min/max system and process in place, but it is not fully developed. • Currently, there are eight permanent plant and 24 non-permanent plant (16 of the BPOs are associated with civil products); and 16 permanent plant BPOs in the schedule for establishment. The use of these BPOs is not fully implemented and used by the project. • All requisitions are screened for material that may be in the system. Recommendation(s) • **(Priority 1)** Expedite the implementation of the identified BPOs so that construction can use them rather than writing individual material requisitions. • **(Priority 1)** In developing the "list" of BPOs in place that would support a min/max system, construction and field engineering personnel should help define what products should be maintained within the min/max system. • **(Priority 1)** Educate site personnel on the use and process of the BPOs and the min/max system.
P9	Observation(s) • In discussion with the materials team, there was a lack of planning and coordination for material requests/withdrawals. The majority of material requests come in as a "rush". • Material requests generally are generally not submitted to procurement with any lead time, coordination, or planning, which results in an inefficient method of operation. • Work is performed by work package, and materials are scheduled in accordance with the schedule. Recommendation(s) • **(Other)** Work with construction and establish a "planning tool" such that the two organizations better communicate needs so that requests are not in a continual rush mode of operation. • **(Priority 1)** Establish a two week look-ahead planning tool. This is needed as material for a given request is most likely in multiple locations with the current laydown yard situation. • **(Other)** Consider storing material by work package, as this will make withdrawal more efficient and act as a confirmation that all material is on-site and available.
P10	Observation(s) • In reviewing schedule status reports and in discussions with procurement management, it is unclear if all options have been exhausted with respect to sources of supply and allocation of work to a given module fabricator. CB&I is analyzing work allocation based on current performance, shop loading, and construction schedule needs. • It was said that this activity is complete and that the distribution and proper allocation of work has improved. Additionally it was stressed that the performance of assigned fabricators was improving. With the past performance of the fabricators along with design changes, intrusive management of these fabricators is needed. As these issues are of a commercial nature,

Table 4-1. Procurement Observations and Recommendations	
No.	**Description**
	Bechtel did not see the details. • Based on a review of the September 28, 2015 ROYG report (Item 15.16), there are multiple deliveries in the red indicating that they do not support the schedule. Recommendation(s) • **(Priority 1)** Continue to analyze work allocation based on current performance, shop loading, and construction schedule needs. • **(Priority 1)** Confirm the ability of the existing eight module fabricators to support the schedule with the resources, flexibility, and wherewithal to handle the work. • **(Priority 1)** Complete an analysis of the ROYG report (Item 15.16) and their associated fabricator and develop a plan to have deliveries made in accordance with the schedule.
P11	Observation(s) • There is an issue with compliance with project and Purchase Order requirements to support the accuracy of required documentation. This issue seems to cross all of the procurement activity. • CB&I's process stipulates reviews and accepts documentation packages at the supplier's facilities, as appropriate. Recommendation(s) • **(Other)** Reconfirm that Purchase Order and/or Contract requirements are clearly and properly stated. • **(Other)** Re-review with the supply chain their understanding of requirements. Monitor for trends and address with supplier management. • **(Other)** Address the training of individuals reviewing documentation packages to ensure their understanding of the requirements and processes.
P12	Observation(s) • In general discussions with CB&I's procurement manager on risk items, a lack of overall effort and focus was observed. Items are identified but it is not clear how diligently CB&I is managing these risk items to closure. • Risk Register Item #67 –Critical Equipment/Vendor Supply and Oversight – is still under development and owned by site procurement. Recommendation(s) • **(Other)** Hold procurement accountable to close risk items as scheduled.
P13	Observation(s) • After meeting with CB&I's procurement manager, there appears to be a workable process in place for managing purchasing, expediting, and materials management activities that has evolved as the project has grown. The observation is whether there are enough resources applied to properly monitor/manage activities. • Additionally, design changes were a recurring topic of discussion regarding the management of the current eight agreements for module fabrication. When looking at the ROYG procurement report, there are multiple modules that are in the red. Recommendation(s) • **(Other)** Complete the analysis of ROYG report to properly assess the schedule. Ensure proper

Table 4-1. Procurement Observations and Recommendations	
No.	**Description**
	attention/monitoring is in place. • **(Priority 1)** Reconfirm the expediting resources available to manage the fabrication Purchase Orders and improve schedules. • **(Priority 2)** Improve the efficiency of change management, as it takes too long to resolve issues that will allow completion of fabrication.
P14	Observation(s) • In discussions with all groups, the subject of CGD was brought up and the concern of the project requirement being properly conveyed and the supply chain complying and knowing "what to do". • Further, with the evaluation process being time consuming and with the current submittals under review from suppliers and resulting outcome, the effect is unknown. Recommendation(s) • **(Priority 2)** Expedite the resolution of CGD issues so that if the material has to be replaced, it can be in time to support schedule. • **(Priority 2)** Revalidate the Purchase Orders that have compliance issues so that verification is documented and all material is accounted for. • **(Priority 2)** Increase the interactions with suppliers to ensure the Purchase Order/specification requirements are understood and CGD is properly supported by the supplier and project engineering.
P15	Observation(s) • CB&I uses the Smart Plant operating platform as their requisitioning tool onsite. This program appears to be functional from the creation and routing of a requisition through to the assigned buyer and subsequent award. However, there is no expediting module within Smart Plant, thus the tracking of open Purchase Orders is done manually via an Excel tracker, and there is no mechanism in the system for an individual to look up the status of an open Purchase Order. • It was also noted that the ability to track requisition/Purchase Orders by work package was not available; this function was also done manually. The issue here is that an item must be tracked manually rather than using the system, which is an inefficient means of monitoring materials and assuring all material is accounted for in a given work package. • It was noted that the site procurement team has manually created status reports that track open orders and are used with their coordination with construction. Recommendation(s) • **(Priority 2)** Expand/enhance existing tools to accommodate site needs, such that status data can be maintained and available for view by the project. • **(Priority 2)** Develop a system whereby data management/entry is completed within one system.

Table 4-1. Procurement Observations and Recommendations

No.	Description
P16	Observation(s) Review of the ROYG report shows the following: **Category** / **WEC Remaining Equipment Delivery Count** / **CB&I Remaining Equipment Delivery Count** Red: 54 / 1,159 Orange: 29 / 218 Yellow: 27 / 143 Green: 347 / 1,387 **Total: 457 / 2,907** • CB&I procurement management described that they recognize this data is not correct in the ROYG report. A "schedule adherence activity" (project) by discipline is currently underway for the past 8 weeks, as there are activities that are not correctly tied, thus the data in ROYG is incorrect. • The schedule adherence project was to be completed by October 31, 2015 and is expected to result in clear visibility as to what commodity/equipment requires a mitigation plan from an overall perspective versus an emergent need on a daily/weekly/monthly basis. Thus, as of the writing of this report, the use of the current ROYG report data is not useful in the schedule analysis. Recommendation(s) • **(Priority 1)** Complete the schedule adherence effort as planned by October 31, 2015. • **(Priority 1)** Evaluate resource needs to properly manage items identified in the ROYG report as impacting construction need dates.
P17	Observation(s) In discussions with the site procurement team regarding work package planning (creation/issuance), it was observed that late issuance translates into late requisition creation and the need for material to support construction need dates turns many procurements into a "rush" situation. The planning and issuance of work packages is out of synch with the procurement cycle and inhibits the procurement and delivery of material in an orderly manner. Recommendation(s) • **(Priority)** Adjust work package planning to allow for a "normal" state of operation for the downstream activities after the work package is issued.

5. Construction and Project Controls

This section describes the assessment of the construction and project controls aspects of the project. Section 5.1 provides a summary of the current status. Section 5.2 provides construction and project controls observations and recommendations.

5.1 Current Status

5.1.1 Introduction

As part of the assessment, Bechtel's construction and project controls personnel gathered a wide variety of information on the history and current status of the effort, such as:

- Reviewing organization charts
- Touring various areas of the site (e.g., Units 2 and 3 nuclear islands, turbine areas, module assembly building (MAB) and laydown areas, temporary facilities)
- Reviewing schedule information, including indirects, bulk quantities, installation curves, manpower curves, and weekly/monthly reports
- Attending safety meetings, plan of the day (POD) meetings, module status meetings, and area schedule meetings
- Meeting with a number of individuals to understand the work packaging program, quality organization, project controls organization, engineering status, procurement program, constructability and strategic planning, startup and turnover plan, and the document control process
- Holding meetings to understand shield wall installation schedule, management of indirects, craft recruiting (industrial relations), and raceway and hanger installation challenges.

Early in Bechtel's assessment, the Consortium presented to Bechtel their organizations and the status of and the plan for the project. The Consortium provided Bechtel the estimated bulk quantities for installation, as well as the budgeted jobhours and performance to date by general account (such as concrete, piping, and electrical; but no further breakdown). The Consortium would not, however, share the unit rates.

It was apparent that contractual issues between the parties are impacting the work. Timely resolution of problems does not seem to have the quick response needed by the project to achieve the schedule.

The project can be proud of its safety record, especially the months of August and September 2015 where the project had only one recordable each month. The cleanliness of the site and work areas really stood out during Bechtel's walkdowns.

Some of the primary contributing factors to project performance include:

- Working too many hours for an extended period — the work schedule is a 58 hour work week (5–10s and 1-8) with selected overtime
- Non-manual turn over — the rate for the year to date is greater than 17%
- Amount of time the craftsmen are at the work face — numerous issues are keeping the craftsmen from performing work
- Engineering design changes during construction and slow resolution of issues — work is continually being impacted
- Organization at site — The Project Management Organization (PMO) and the Operations Control Center (OCC) are set up to treat the to-go work like an outage, with status of the next week's work reviewed on a daily basis
- Use of modules — While a great idea in theory, their use so far has been a detriment to the project progress and consequently the budget
- Construction of nuclear plants today is different from the previous generation in the 1980s. It doesn't appear that all the new requirements were included in the estimate.

5.1.2 Construction Staffing

The project is heavily into the civil phase of the work, with concrete approximately 30% complete and structural steel approaching 20% complete. The piping and electrical bulk installation has just begun, with only a small amount of pipe in the turbine building being installed. The current construction staffing levels are approximately:

- Supervision — 85
- Field engineering — 290
- Direct craft — 800
- Indirect craft — 1,100

With only 800 direct craft, the supervision and field engineering ratio to craft is at present quite high. However, it is expected that when the craft staffing level peaks at approximately 4,000 (i.e., a Bechtel estimate), the ratio will be at the appropriate level if the number of non-manuals increases marginally.

5.1.3 Schedule Continues To Slip

A revised schedule was issued in January 2015, and since then the schedule has slipped significantly. The continuing problems with the modules have been a big part of the reason for the schedule slippage. Impacts from late design changes have also impacted the work. A large number of interferences have been identified and the time it takes to resolve those interferences as well as other problems such as construction errors has had a significant impact on the schedule. In addition, the concrete portion of the shield building is complex and has impacted the schedule.

There are plenty of work areas available to work, but the current staffing level will not support their needs. In an effort to improve accountability on the project, the Consortium recently introduced a Project Management Organization and an Operations Control Center. These organizations have meetings every day, and although they are improving the accountability and problem resolution, the time that the construction management personnel spend updating the issues discussed is impacting their ability to be out in the work areas. Finally, non-manual turnover is running at greater than 17%, which is impacting the morale on the project as well as the schedule.

5.1.4 Major Issues Affecting Schedule and Performance

There are a number of major issues that are having significant impacts to the schedule and the performance of the project, as described below. The Observations and Recommendations section also provides additional details.

a. Working Too Many Hours for an Extended Period

A large percentage of the personnel on the project have been working 58 hours (5-10s and 1-8 hours per week) for an extended period of time. One of the reasons given was that the overtime is used to attract the craftsmen (the project is advertised as a 48 hour work week). While overtime is used to attract crafts, the project pay scale is competitive with most non-union projects in the Southeast U.S. CB&I is presently struggling to attract rebar ironworkers and will have similar problems with pipefitters and electricians (there will be 2 to 3 times as many pipefitters and electricians as ironworkers) when the project is heavily into the bulk installation.

There are other ways to attract craftsmen besides overtime. Incentive programs have been developed, such as providing an incentive of $1/hour for craftsmen staying until given a reduction in force, which would lower the almost 20% of craft resignations year to date. A lot of time and money is expended getting the craftsmen on board, and an incentive program like this would help retain them.

CB&I is considering increasing the amount of overtime in order to gain schedule. Numerous studies by the Construction Industry Institute, Business Roundtable, Department of Labor, and the trade unions have shown that when extended overtime is worked more than 8 to 9 weeks, the performance deteriorates quickly resulting in a 58 hour week approaching the performance

equivalent of 40 hours. The costs definitely outweigh the benefits of this approach, for in addition to reducing productivity, extended overtime also negatively affects morale, decision making, and safety.

b. Significant Non-Manual Turnover

The non-manual turnover for the last year has been greater than 17% which is high for a typical nuclear project. In particular, the Unit 2 Nuclear Island has had five different managers since the start of the project. There are a number of issues contributing to the turnover; most pressing is CB&I's difficulty in finding experienced, qualified people. While they have been hiring some of the older and experienced people who worked on nuclear power units back in the 1980s, many of these individuals are now in their 70s and this type of construction is better suited to people that can spend entire days on their feet moving from one work location to another throughout a normal work day.

Many of the non-manual personnel expressed frustration and being "worn out" due to the amount of overtime they put in to meet the job demands, as well as having to meet the informational requirements imposed by the PMO and the OCC.

Managers and supervisors working on a nuclear power plant are under constant stress. The safety, cost, and schedule concerns never cease; and when these are compounded with the frustrations of design changes, Owner demands, worker complaints, and the difficulties of achieving installation work, the stress is great, creating turnover issues.

c. Craftsmen Time at the Workface

Because of the requirements of the project, the craftsmen are not able to spend a full workday at their place of work. There are many factors involved, but the biggest one seems to be the Work Package (WP) procedures. For example, most concrete WPs include three volumes with each volume being three or more inches thick. One volume has safety bulletins, quality control signoff sheets, and general information associated with the work; one has drawings and specifications; and one has design changes. In some packages, the design change volume is twice as thick as the drawing volume.

Each day the foreman must check out the WP from document control and take it to the workface. If there had been a change to the WP in the last 24 hours, the package is put on hold until the field engineer can locate the change document in the package and replace it. If the field engineer is not available immediately, the foreman must wait to check out the WP until the field engineer is available. As a result, no work is performed until the WP is updated.

We observed the start of the work shift and it took approximately an hour for the craftsmen to start work. Further, the craftsmen leave the work area for both coffee breaks and lunch. Arrangements should be made to have the crafts stay in the building during coffee and lunch breaks.

It is a common practice to transfer craftsmen from one area to another to provide support, as needed. This is usually done on an occasional basis, after which they return to their original work location. Because of the project schedule pressure, these transfers have become standard practice, leaving some work areas (for example, the Unit 3 nuclear island) with a management team that has few craftsmen to perform the work. The present difficulty in recruiting rebar ironworkers just increases the problem. Combining Unit 2 and 3 nuclear island non-manuals might help solve some of these issues.

At this phase of construction, as elevations in the buildings are completed, there is usually space to allow the craftsmen to locate “gang boxes” and storage boxes on each elevation, so the tools needed for the work are located near the work area. Because of the ongoing module work and the small footprint of the buildings, some workers are required to carry their tools to the work area every day. If they find they need something they did not bring, they have to leave the building to get it, which is another cause of time away from the workface.

d. Engineering Design Changes and Slow Resolution of Issues

A large part of the schedule slip is related to late design changes, slow resolution of interference issues, and the time it takes to resolve construction errors and quality problems. A large number of these issues are related to module construction. Many of the changes come at the last minute, which requires the construction group to revise their plan, which can have a significant impact on the work. In addition, changes are not being incorporated into the drawings in a timely manner, causing the craft to spend a good deal of time confirming they are working with the latest information.

When questions arise due to design interferences or an engineering analysis of a construction or quality problem is needed, it appears that either there are not enough engineering resources to address the issue, or the issue is not addressed with the urgency needed to keep schedule and cost impacts to a minimum. Apparently, there are a number of minor issues that used to be resolved by field engineering, but now require design engineering resolution. For example, each stud bent more than 15 degrees requires a design engineering resolution – this is just one example out of hundreds. Construction has developed a generic guidance document to have design engineering provide some standard procedures to address many of the minor issues. However, a review of the issues requested indicates design engineering could provide more relief to construction if more effort was spent in analyzing the issues. In addition, some of the responses construction has received seem to be much more complicated than necessary (e.g., the missing dowels from containment pour 4 which had to be drilled and grouted in). A loosening of installation tolerances would be one area that could provide construction with some significant benefits.

Construction has initiated a constructability review and a strategic planning effort which reviews the design to identify interferences and determine if there are constraints to the work. This should help drive down the number of interferences that affect work schedules.

As long as there are late design changes occurring and there is not expeditious resolution of issues that arise, there will continue to be significant schedule slippages.

e. Site Organization Impacts

The PMO meets daily in the POD meeting with site senior personnel to review near term work and review the progress (or impacts) made in the last 24 hours. The OCC meets daily with area superintendents to review the 3-week look-ahead schedule to determine progress against the schedule and identify issues that may affect it. Both of these efforts are run similarly to the method used for short term operating nuclear plant activities, such as a refueling outage or completing startup work. There are some real benefits to this approach, such as identifying what is holding up the work and determining where to focus the efforts to overcome those barriers. However, there is also a big downside to using this approach on a large construction project that is still in the civil work stage, as it causes a large number of resources to be occupied with providing daily updates instead of focusing on the work in the field.

A large project such as V.C. Summer is divided into areas, so that area teams can take full ownership of the scope handled in that area. Assistance in resolving issues (which the PMO provides) allows the team to focus on the work, but it should only focus on resolving the engineering, procurement, and quality impacts and hold schedule meetings once or twice a week. Having a daily schedule meeting which the OCC presently does, requires a lot of time and detracts from the focus required to get the construction work done. If the PMO wants to address the construction progress, they can do so in the weekly schedule meeting.

In May 2014, a management decision was made to set the CA20 module in the auxiliary building even though the module fabrication was not complete. Completion of the module is not expected until the end of this year, and doing this work in the building has had a significant impact on the cost and the schedule to the project. The module should have been left in the MAB where there is a controlled environment and access to the module is much easier using man lifts and scaffold. Had it been left in the MAB until assembly was complete, one would expect that some of the schedule slips this year would have been mitigated.

f. Changes in Current Nuclear Power Plant Construction Versus the 1980s

In the 1980s, the building boom for nuclear power plants was coming to an end. The boom had started in the 1960s, so there were many experienced craftsmen and non-manuals available, some with 20 or more years of experience. There were also numerous nuclear equipment suppliers and multiple engineering and construction organizations.

The normal practice then was to start engineering and within a few years, start construction while engineering was ongoing — usually keeping a step ahead of construction. Construction had lots of input into the design, ensuring that the project was “construction friendly”. The plants were built under the Construction Permit/Operating License approach of 10 CFR 50, so proceeding with

construction “at risk” was a common practice. Field engineering had the authority and latitude to resolve many of the issues that arose during construction.

At V.C. Summer, a standard AP1000 design is being built that is planned to be used on numerous sites. In comparison to the nuclear power plants of the 1980s, the AP1000 has reduced quantities, encompasses a smaller footprint, and uses modules extensively. However, the reality as experienced on V.C. Summer has shown some issues with this new, modernized design. The modules, while a great concept, have proven to be an impediment to the construction and are much more complicated to fabricate and install. While the quantities have been substantially reduced along with the footprint, in some areas the density of the material in the area has increased, resulting is a more difficult installation and an increase to schedule. While designing the plant in multiple locations, it appears that the coordination between those groups was inadequate in some instances. It also appears that few constructability reviews were performed, resulting in many interferences and difficulties with the construction.

Experienced craftsmen and non-manuals will continue to be hard to find. Efforts are going to have to be made to train them and find ways to make their jobs easier. The project has an extensive onsite training facility that is capable of training individuals to become most any craft. Recently, 13 laborers were trained to become rebar ironworkers where they currently have a shortage. The training program needs to be expanded and kicked into high gear to start developing pipefitters, electricians, welders, and more rebar ironworkers. WP procedures need to be reviewed to make it easier for the craftsmen to spend time at the workface.

5.1.5 Key Schedule Challenges

a. Staffing and Productivity

A significant project challenge is obtaining the craftsmen and getting them productive. At present, the project is challenged to obtain enough rebar ironworkers and in the future, the challenge will be obtaining the large number of pipefitters and electricians in the not-too-distant future. Currently there are several areas where there is workable backlog (e.g., only 100 craft in the Unit 3 containment, several elevated floor slabs in the Unit 2 turbine building where rebar could be installed, and no work in the Unit 3 turbine building). Over the past several months, the project has been achieving a 0.5% progress per month when the Consortium’s schedule requires 1%. The project needs to work the available workfaces to increase the progress. The future needs are 2.5% to 3% per month. The industrial relations group needs to get out in front with training and obtaining the craftsmen needed.

The project has several requirements of the craftsmen that keep them from the workface, and these need to be addressed. The WPs need to be simplified in order to provide the foreman only the information required to accomplish the work and have quality control sign-offs. At present, the WPs include safety information that duplicates the weekly safety bulletins, the specifications and standard details, and too many design changes without updating the design drawings. The WPs, in some cases, are three inch binders, when the package the foreman needs is less than 1 inch

thick. The morning safety bulletin requires each member of the crew to sign the back of bulletin; it takes 15 minutes for a crew of ten to review and sign the bulletin. Thus, it takes over an hour each morning to get the crews to the workface. A senior construction person should work this issue with the goal to getting craftsmen to the workface sooner, thus becoming more productive.

The overtime, 5-10s, and 1-8 plus selective overtime needs to be reduced to no more than 4-10s and 1-8 so both craftsmen and non-manuals can be more productive. After 8 weeks of 60 hour work weeks, studies have shown that in actuality only 40 hours of work is really being produced.

b. Non-Manual Turnover

The non-manual turnover is too high to build a productive organization. There have been five different area managers in the Unit 2 containment since the project began, and all the area managers' names have changed since the first of the year except one. Reducing the overtime should reduce personnel turnover.

c. Current Forecast

A new forecast with realistic unit rates and the latest quantities needs to be developed so accurate craft staffing needs can be forecast. Once a good unit rate base is established, the craft and their superintendents need to be held accountable for weekly cost (jobhours per unit of work) performance. At present, not enough attention is given to craft performance. The indirects need to be evaluated and burn down curves developed. The ratio of 1,100 indirect craftsmen to 800 direct craftsmen is not typical.

d. Engineering Changes

Another major challenge is the amount of engineering changes due to interferences when installation is underway; these require engineering evaluations which take a good deal of time and affect craft productivity. Until this impact can be reduced, the craft productivity will continue to be impacted and the schedule will continue to slip.

5.1.6 Assessment of Project Controls Organization and Tools

A successful project controls platform requires competent team members, a project controls plan, and strong EPC integrated project management tools to track project progress and performance. It was identified over the course of the assessment that the Consortium's project controls team is competent and does have the appropriate level of experience required to manage the project. Inversely, the Owner's organization lacks the appropriate personnel to provide the proper level of review and oversight required to drive the project to successful completion.

Bechtel's assessment was focused on the schedule aspects of the project only. Cost was reviewed solely in terms of hours and productivity. In general, the project management tools that are in place to track the schedule are sufficient, but in some cases the processes and data used

require change. For example, the Consortium's bulk installation curves include both below and above ground commodities within the same curve. The bulk curve tracking tool itself is appropriate, but the results become suspect when combining these commodities. Since the underground activities occur significantly in advance of the above ground, the calculated sustained duration window is extended creating false results for evaluation of achievability.

The primary scheduling tools reviewed included the bulk installation curves, Level 1 schedule, and Primavera Level 2 & 3 schedules. Each of these items is addressed within the observation and recommendations identified in Section 5.2. In summary, these tools appear to contain the majority of procedural requirements and are deemed acceptable. The issues that exist with these tools occur within the data or level of tracking detail. Overall, the integrated project schedule contains the entire scope of the project. The issue is the appropriate level of detail contained at each level of the schedule.

- The Level 1 schedule lacks the appropriate level of detail to be considered a useful tracking tool. It only contains some of the required dates and the overall logic sequence is not well represented, nor easily understood by the reviewer.
- The Level 2 schedule within the Primavera tool is only a roll-up of the also included Level 3 schedule residing within. These rolled up Level 2 schedule activities, otherwise known as "hammock" activities, have a limited usefulness due to the extended durations caused by inactivity areas within a logic string. The Consortium's Level 2 schedule, which uses the before mentioned "hammock" concept, reflects the typical parallel activities which hide critical logic ties resulting in a tool with limited usefulness.
- Unlike the Level 1 schedule, the Level 3 schedule includes a massive amount of detail. Bechtel's experience is that an appropriately sized Level 3 schedule, without the working level schedule details included, results in a more efficient and accurate tool to monitor the overall project. For V.C. Summer, the Consortium has included their Level 5 working level schedules, within the Primavera Level 3 database. This results in an overall EPC Level 3 schedule containing over 250,000 activities. Maintaining a schedule of this size takes a great amount of effort and its accuracy can be questionable. The time taken to maintain the schedule also detracts from other areas of the planning process which in most cases is more effective than the detailed schedule updates. This practice can also create a short sighted view with a loss in focus of what it takes to complete the overall project.

5.2 Observations and Recommendations

Construction and project controls observations and recommendations are identified in Table 5-1.

Table 5-1. Construction and Project Controls Observations and Recommendations	
No.	**Description**
CPC1	Observation(s) The MAB team has been given responsibility for completing the assembly of module CA03 for Unit 2, which was shipped to the site incomplete, because the vendor could not meet the site need date. They also have several Unit 3 module assemblies to complete and all work should be complete by Summer 2016. Recommendation(s) • **(Priority 1)** Since the MAB has a substantial amount of work remaining in addition to the work on Unit 2 CA03, it is recommended that a resource-loaded schedule be developed and some type of plan to predict and measure performance. Since this is not typical construction work, an example might be jobhours per lineal foot of weld. The development of these tools should help keep the work on schedule and within budget. Since the shop is performing so well, a study should be performed to see what other work they can be perform as they complete module work.
CPC2	Observation(s) The Unit 2 auxiliary building CA20 module was set in May 2014, however the fabrication and assembly was incomplete. The outstanding work was substantial and was reported to Bechtel to be as much as 50%. Seventeen months after setting the module, work continues in the field to complete the assembly. The work in the field is substantially more difficult and costly as compared to performing it in the controlled environment of the MAB, which allows easier access using man lifts which cannot be used in the field, better lighting for two shift work, and inside a building so weather is not a factor. Recommendation(s) • **(Priority 1)** A detailed evaluation of the to-go work should be performed so that management understands the cost and schedule impacts before deciding to install something out of sequence.
CPC3	Observation(s) • An observation from the POD meetings is that the details discussed in these meetings results in micromanagement and short term planning of the specific construction activity. This type of detail management may be needed to resolve engineering (since it is in punch list mode), procurement, or quality items affecting the construction work, but for this phase of the construction, the detailed construction planning should be done by the area teams. • It was observed that approximately 30 people attend the daily POD, however less than 15 provide input. The remaining participants are there to answer any question that may come up. • Four days per week, the area supervision team spends significant time to gather information to meet with the PMO personnel to provide status of the day's progress and issues so they can be knowledgeable at the POD. This takes craft supervision out of the field, away from the craftsmen where they are needed. Recommendation(s) • **(Other)** The focus of the POD should be on resolution of issues (i.e., engineering, procurement, and quality) impacting the construction activities. The area construction teams should

Table 5-1. Construction and Project Controls Observations and Recommendations	
No.	**Description**
	develop the three week look-ahead schedule and monitor the plan in the area construction meeting, which should not be held more than twice per week. The reason a project of this size is broken down into areas is because it is too big to manage construction from a central group (for example, a PMO). Delegate to the area team the responsibility for cost and schedule. The PMO should provide support to resolve engineering, procurement, and quality issues as needed and integrate all facets of the project.
CPC4	Observation(s) The field material requisition process is time consuming, resulting in delays in schedule and impacts to productivity. There are nine (9) people who sign off on field requisitions and if one requires changes, the process stops, the changes are made, and the process starts all over again. Several superintendents have indicated that this process applies to all material including construction aids and construction materials. Recommendation(s) • **(Other)** Look at streamlining the process for construction aids and material. In addition, look at expanding the min/max program to ensure enough material is continuously maintained to adequately support construction. This would cover items such as stock steel (angles, channels, etc.), fasteners (bolts, nuts, washers, etc.), piping material (studs, gaskets, etc.) and conduit fittings and unistrut.
CPC5	Observation(s) A review of the reading room documents suggests that the budgeted unit rates may not have been estimated and resource-loaded to account for differing locations and complexity. As an example, the budgeted unit rate of 35 to 36 jobhours per ton for rebar installation is used for standard as well as complex installations. The turbine pedestal, elevated slabs, and wall rebar installations require higher unit rates than a base mat installation. Craft productivity against the as budgeted unit rates has been difficult to achieve to date. This results in poor morale and an unmotivated effort to measure craft productivity. Recommendation(s) • **(Priority 1)** The project should complete a reforecast based on to date performance, and establish realistic unit rates for the bulk installations. These realistic unit rates times the forecasted quantities will result in better projections of manpower needs by craft needs and craft performance can be monitored. • **(Priority 1)** Adjust the rates to take into account present performance impacts such as: work packaging, skill levels, experience of personnel, and 10 CFR 52 licensing requirements.
CPC6	Observation(s) • The current status of piping deliveries to each unit are as follows: — Unit 2: 82% B31.1 is at site; 56% ASME is at site — Unit 3: 63% B31.1 is at site; 28% ASME is at site • It was stated that 20% to 30% of delivered spools at the site require rework due to changes which include revisions due to valve lengths changes, equipment nozzle relocations, etc. WEC's Engineering Manager explained that the majority of the changes were due to movement of hangers on the piping isometrics, not physical changes to the pipe.

Table 5-1. Construction and Project Controls Observations and Recommendations	
No.	**Description**
	Recommendation(s) • **(Other)** The project needs to determine how much rework is required on the delivered pipe spools and get it done prior to delivery to the installation point.
CPC7	Observation(s) Indirect labor and materials are a major cost to the project. Presently there are more crafts working indirect (1,100) than direct (800) work. Normally on a project at this stage, indirect costs should be about 30% of direct costs. The addition of an Indirects Manager three (3) months ago is a good addition to the team. This manager will provide visibility to indirect charges so management can make the appropriate changes and reduce the costs. Additionally, a review of the construction equipment plan shows a large part of the construction equipment demobilizing next year, which appears to be too early based on progress to date. Recommendation(s) • **(Priority 2)** The project should develop a craft staffing plan to reduce the indirect costs and staffing to a reasonable level. It should be monitored weekly just like direct work. A reforecast should also be performed along with a revised equipment plan.
CPC8	Observation(s) A comparison between CB&I non-manual organizational charts issued 7 months apart revealed significant non-manual turnover. The turnover included several key areas such as the Unit 2 Nuclear Island Construction Manager (this is the fifth manager since the project began), MAB Area Construction Manager, Turbine Building Area Construction Manager, as well as non-manual personnel reporting to area managers. The reported turnover of non-manual is greater than 17%. With such a high turnover rate it will be difficult to build a productive non-manual organization. Recommendation(s) • **(Priority 1)** Perform an evaluation of why the turnover in non-manuals is so high. Areas to investigate would include the demand to work excessive overtime, conflicting management direction, or the micromanagement of personnel. The resolution of some of these potential issues would help reduce the turnover of the non-manual workforce.
CPC9	Observation(s) There were 21 rebar dowels left out of Lift 4 of Unit 2 containment slab placement. Engineering required that the dowels be replaced by core drilling and grouting in the dowel rebar. The resolution of the issue and the completion of the work caused weeks of delays to the containment work and possibly the project. Numerous personnel have cast doubt on whether these dowels really needed to be grouted in; i.e., dowel bars with 90 degree or 180 degree hooks could possibly have been used to obtain the required bar development length without core drilling and grouting. Recommendation(s) • **(Other)** A dedicated team of senior subject matter experts from both WEC and CB&I engineers should be engaged to review these types of situations to ensure that the proposed fix, which will have a significant impact on schedule, is really required. In addition, this team should assist with resolution of critical issues from the time of discovery of the issue to ensure it is resolved with as small an impact to the project as possible.

Table 5-1. Construction and Project Controls Observations and Recommendations	
No.	**Description**
CPC10	Observation(s) • The project has had difficulty hiring skilled craftsmen, especially rebar ironworkers. When the project reaches peak staffing the need for pipefitters, welders, and electricians will increase substantially. It is estimated that this project will need in excess of 900 pipefitters and 700 electricians. • Bechtel visited the onsite training facility and were impressed with the capabilities. The Consortium had just trained 13 rebar ironworkers which was immediately helpful to the project and this type of "immediately needed training" needs to be expanded. • A project-specific labor survey had not been recently performed. Recommendation(s) • **(Priority 2)** In addition to onsite training, CB&I should consider establishing a training school off site (possibly at local vocational schools) to train pipefitters, electricians, and welders to insure they can fill their needs in a timely manner. • **(Priority 2)** There are 6 onsite classrooms available which should be used full time to develop those crafts that are presently or will be in short supply. • **(Priority 2)** A project-specific labor survey should be performed.
CPC11	Observation(s) Aging of the construction workforce is impacting productivity. Recommendation(s) • **(Priority 2)** Develop mentoring and training plan to promote junior craft and field engineering personnel with periodic evaluations and feedback sessions. • **(Priority 2)** Create and staff shadow positions for senior level positions within the Consortium intent on developing new talent that is focused on project completion.
CPC12	Observation(s) The concrete being used is self-consolidating and does not need vibrating. However, in a number of areas, mostly where there is dense rebar, voids in the concrete were evident. Recommendation(s) • **(Other)** In areas of dense rebar, additional consolidation such as standard concrete vibrating or form vibrating should be used to ensure complete consolidation of the concrete.
CPC13	Observation(s) • Presently, some parts of the project are working 58 hours (5-10s and 1-8 hours). Studies by the Business Roundtable, Construction Industry Institute, and Trade Unions have been done to assess the impact of working extended overtime. They have shown that after eight (8) weeks, the productivity drops by approximately 40%, which means that you would be getting 40 hours of work for 58 hours pay. Extended overtime also has an effect on absenteeism, accidents, physical and mental fatigue, morale, attitude, turnover and supervision decisions. The schedule also suffers, which adds more pressure to work overtime. • In discussions with CB&I Industrial Relations, it was stated that when the recruiters hire craft personnel, they are told the project is on 4-10s and 8. A general feeling is that the project would maintain the work force if the 6 day weeks were stopped. • The craft turnover rate is 20%. CB&I is expending a lot of money to hire and orient craftsmen.

Table 5-1. Construction and Project Controls Observations and Recommendations	
No.	**Description**
	Recommendation(s) • **(Priority 1)** The work week should be reduced to no more than 48 hours (4-10s and 1-8 hours). With the monies saved not working as much overtime, consideration should be given to a craft incentive plan that rewards staying on the project until given a reduction in force, and/or productive and safety incentive. • **(Priority 1)** To reduce the turnover, CB&I should consider a craft incentive of $1/hr which would only be paid when a reduction in force occurs.
CPC14	Observation(s) There are occasions where the construction team is too optimistic when scheduling work. Recommendation(s) • **(Priority 2)** Work activities should be planned based on a realistic evaluation of the work, rather than optimistic projections due to schedule pressure from management. This way, craftsmen will be working productively. The project should consider a rule that the placement must be signed-off, except for final clean up, the day before the placement
CPC15	Observation(s) Although the construction team is being pushed hard to maintain schedule, the project schedule continues to slip for a variety of reasons, including design changes and clarifications. As a consequence of the focus on schedule, the cost does not receive the attention it should. The craftsmen do not focus on productivity as they should due to the schedule changes over which they have only partial control. The outcome of this will be an extended schedule and a cost overrun. Recommendation(s) • **(Priority 2)** Maintain the schedule focus, but not at the expense of project cost. When engineering issues arise, adjust the schedule accordingly, so the craftsmen still feel they have some control and responsibility for working the schedule within budget.
CPC16	Observation(s) During walkdowns of the Unit 2 turbine building and the Unit 3 nuclear island, it was noticed that there were numerous work faces available, but no work was underway. The Unit 3 containment had only approximately 100 craft working. When this was questioned, both superintendents stated that craft personnel had been moved to the Unit 2 nuclear island as it was more important. Recommendation(s) • **(Priority 1)** Staff up to allow working of all available work areas. Leave craftsmen assigned to one area so they feel they are part of an area team. It may be appropriate to combine the Unit 2 and Unit 3 containment to better use non-manuals and make some personnel available to fill other project needs. This would allow better incorporation of lessons learned by both non-manuals and craftsmen in Unit 2 to improve Unit 3 performance and schedule.
CPC17	Observation(s) • The superintendent provided drawings of the raceway and hangers in the containment which showed congested areas. From looking at the drawings it is evident that there will be numerous interferences. Additionally, the electrical hangers are much more complex than normal electrical hangers.

Table 5-1. Construction and Project Controls Observations and Recommendations	
No.	**Description**
	• In the containment, hangers are located by plant latitude and longitude. Locating these will require a survey crew rather than allowing the craftsmen to do it. Recommendation(s) • **(Priority 1)** An interference review should be performed and any interference found should be resolved prior to start of installation. Some estimates should be performed to determine whether it is cheaper to install the hanger as designed or redesign the hanger. Once a decision is made, a reforecast should be performed to determine what the real costs would be. • **(Priority 1)** Hanger locations need to be located on the drawing using reference lines in the containment.
CPC18	Observation(s) Based on discussions with supervision and field engineering and attending the PMO meetings, it is apparent that there are numerous design changes and design clarifications that affect the work resulting in negative impacts to the schedule of the work. The majority of these are in the civil discipline. One would expect similar issues in piping mechanical and electrical. Recommendation(s) • **(Priority 1)** Ensure that the design organization recognizes the importance of design changes and clarifications and is staffed to address them immediately. The negative impacts to the project will not decrease as long as changes continue and clarifications are slow to come from engineering and will continue throughout the project unless a change is made.
CPC19	Observation(s) The present staffing curves for manual manpower are classic bell shaped curves. Based on Bechtel's experience, the manual manpower curve will increase towards the latter part of the project and then drop off sharply at the end of the project. In addition, there are no crafts shown on the chart nine (9) months prior to commercial operation to close out punch list items. Recommendation(s) • **(Other)** Re-evaluate the staffing levels based on historical data and ensure there are crafts budgeted for punchlist completion.
CPC20	Observation(s) Installation tolerances are provided for all commodities and may not be exceeded without prior engineering approval. CB&I construction has attempted to relax the requirements and documented their requests in the civil generic guidance document. There are numerous situations where the commodity cannot be installed because of design interferences. As each situation arises, progress is affected while engineering evaluates the situation. The Strategic Planning Group is trying to identify these interferences, but they are not able to identify all of them. Recommendation(s) • **(Priority 1)** Assemble a team of subject matter experts who can meet with field engineering to identify those areas where tolerance increases would help solve installation and interference problems. Examples would include increasing rebar spacing tolerances, increasing pipe location tolerances, etc.

Table 5-1. Construction and Project Controls Observations and Recommendations	
No.	**Description**
CPC21	Observation(s) The project team has a robust safety program which has achieved some impressive results. The safety package handed out at the weekly safety meeting contained a one page tailgate topic for each day of the week. Some of the tailgate write-ups are overly detailed and contain a substantial amount of information, which might be hard to understand and retain. Recommendation(s) • **(Priority 1)** Keep up the good work! The safety department might consider simplifying the tailgate write-up so it could be easier to understand and retain. (For example, the September 25, 2015 tailgate topic on chemical labeling was perhaps too complex.) • **(Priority 1)** At the daily morning safety briefing, each craftsman is required to sign the morning bulletin. This probably takes 15 minutes for the crew to sign the bulletin which is 15 minutes the craft is not at the work face. The need for signatures should be re-evaluated.
CPC22	Observation(s) • The current work package procedure requires the craft foreman (or his designee) to check out the work package each morning and return it to document control each night. If changes have occurred in the last 24 hours it is on hold until field engineering updates it. The work packages must be at the work face during work activities. Some work packages are hundreds of pages long and they contain all related drawings, drawing changes and specifications. A significant amount of time is lost each day implementing the work package process. • Some work packages contain three volumes, some of them over three inches think. The foreman only needs a small amount of this paperwork to perform his daily tasks. Recommendation(s) • **(Priority 1)** Assign a team to review and streamline the work package process. One change might be having the responsible field engineer hold the work package and only issue the relevant drawings (and changes) and inspection, hold points, and signoff sheets to the foreman. • **(Priority 1)** At a minimum, incorporate the design changes into the construction drawings before the craft start work. (It is time consuming for the foreman to refer to multiply design change documents when trying to execute the work). Remove the specifications and standard details from the packages given the foreman, they can be referenced and copies kept in the field stick file trailers. The work packages should only include what is needed by the foreman for their work.
CPC23	Observation(s) Normally, the bulk commodity installation curves are somewhat parallel with the civil work in advance of the piping which is in advance of the electrical work. On the V.C. Summer project, the curves do not parallel each other with some electrical work crossing piping. The time between commodity installations does not appear sufficient to allow installation of bulks in an efficient manner. Recommendation(s) • **(Priority 2)** Adjust the schedule for the bulk installation of commodities to allow enough time between work activities to achieve an efficient and cost effective installation program.

Table 5-1. Construction and Project Controls Observations and Recommendations	
No.	**Description**
CPC24	Observation(s) • The monthly progress report shows construction progress advancing approximately 0.5% per month with a total to date (August 2015) of 21% complete. In order for the plant to complete on schedule, monthly construction progress must increase to close to 3%. There are several work faces without craftsmen, (examples: Unit 2 turbine building elevated slabs; the Unit 3 containment only had 100 men working, and no work in the Unit 3 turbine building.) • It takes approximately one hour before the craftsmen get to their workplace. At both of the coffee breaks and lunch time, the craftsmen leave the work area resulting in unproductive time leaving and returning to work. Recommendation(s) • **(Priority 1)** The project needs to staff up to work all available work faces. • **(Priority 1)** Assign a senior construction person to evaluate methods to have the craftsmen spend more time at the workface (One example: move the tool boxes into the building near the work area.) • **(Other)** Have coffee breaks and lunch in the work areas.
CPC25	Observation(s) The Consortium's Integrated Project Schedule has 50 mandatory constraints--20 associated with Unit 2, 24 associated with Unit 3, and six site-specific. • A majority of the mandatory constraints affect fabrication of shield building panels that are forecast for later deliveries from the fabricator, the latest being for Unit 2 149'-6" transition panels currently forecast to be complete 9 months later than the constrained date. The Consortium stated during the September 9, 2015 presentation that a mitigation plan is in process for the shield building panels. • There is a constraint on the Unit 2 auxiliary building R251 module that is currently forecasted to be complete 5 months later than the constrained date. • There is a constraint on the Unit 3 CA01 module ready to lift that is currently forecasted to complete 4 months later than the constrained date. • There is a constraint on the Unit 3 CA20 module ready to lift that is currently forecasted to complete 4 months later than the constrained date. Recommendation(s) • **(Priority 1)** Remove mandatory constraints, and allow the schedule to move based on the logic. Prioritize development of mitigation/recovery plans based on their potential impact to the schedule. Only incorporate mitigation plan recovery into the schedule after it has been fully developed and approved by all parties.
CPC26	Observation(s) The baseline forecast was developed based on a performance factor of 1.15. Recent (last 6 months) performance has been greater than 2.0 on Unit 2, and greater than 1.5 on Unit 3, primarily driven by civil building construction impacts. Recommendation(s) • **(Priority 2)** Update the forecast based on recent performance. Reassess manpower needs based on updated forecast.

Table 5-1. Construction and Project Controls Observations and Recommendations	
No.	**Description**
	• **(Priority 1)** Implement a small sample of piping and electrical work packages well ahead of bulk installation period to assess potential impacts early. • **(Priority 1)** Plan to ramp-up slowly, gradually, to achieve an acceptable productivity level, train leads, and identify challenges and impediments prior to ramping up to full bulk installation mode.
CPC27	Observation(s) The Owners' oversight organization does not have a proper Project Controls staff. Recommendation(s) • **(Priority 1)** Hire an experienced project controls manager, lead planner, and lead cost engineer to perform analysis of the Consortium schedule and cost forecasts. • **(Priority 1)** A separate set of tracking tools should be created by the Owner to provide verification of Consortium reporting. • **(Other)** Special attention needs to be made on the cost reimbursable portions of the scope. This newly formed Project Controls group would provide recommendations and identify areas requiring additional investigations.
CPC28	Observation(s) Consortium reports are provided in either a summary form or in an integrated manner making validation difficult. Recommendation(s) • **(Priority 1)** Where contractually possible, the Owners should request the data that creates the reports not just the reports. The recommended Project Controls team would then analyze the data rather than just reviewing the report.
CPC29	Observation(s) The Consortium has narrowed focus into individual windows with a total horizon of around 9 months. The project reporting has followed suit and a majority of the reports provided focus upon this short time horizon. The reports to the Owners need to continue to be overall project focused. Recommendation(s) • **(Priority 2)** Request all reports provided by the Consortium for the monthly meetings contain the overall view regardless of topic. Breakouts are acceptable and sometimes needed, but overall focus must remain on the overall project performance.
CPC30	Observation(s) Not all reports and/or graphical representations provided within reports include the baseline and/or the Consortium's current forecast. Recommendation(s) • **(Priority 1)** Request all reports provided to the Owners include both baseline information and a current forecast if different than the baseline. If the current forecast is later than the baseline, the Consortium should provide a recovery forecast plan. If cost is being discussed and the cost forecast exceeds the baseline, an estimate at completion should be required.

Table 5-1. Construction and Project Controls Observations and Recommendations	
No.	**Description**
CPC31	Observation(s) Bechtel was told that the contract contains a portion of fixed price and cost reimbursable terms. The charging practice, if not tracked closely, could allow for improper cross charging between accounts. Recommendation(s) • **(Priority 1)** Request staffing plans by position which account for the total project baseline budget for the tracking of jobhours. For the tracking of material type budgets, such as equipment or small tools, a baseline monthly usage plan should also be submitted for baseline tracking purposes. This document would serve as the basis for future negotiations and would provide enough detail for scope increase discussions and also validation of current actual charges.
CPC32	Observation(s) Schedule contingency has not been included within the integrated schedule. Recommendation(s) • **(Priority 2)** Analyze the schedule to identify activities within the critical and near critical paths that contain potential float. At the time of rebaselining the schedule, a schedule contingency analysis should be run and the desired probability of outcome should be agreed on.
CPC33	Observation(s) In reviewing the bulk piping curves, it was identified that the underground and aboveground commodities were included within the same chart. Tracking these together can be misleading especially when validating the sustained rates to ensure an achievable plan. Recommendation(s) • **(Priority 2)** Separate the curves and track all underground quantities separate from aboveground quantities. Also, after creating separated curves, compare the current installation plan to historicals to validate their viability.
CPC34	Observation(s) While reviewing the bulk curves, it was identified that the bulk curves were not developed through the use of standard “S” shape curves. The “S” curves were altered to allow for additional time between the 10% and 90% completion windows to lower the sustained rates. This artificial increase in the sustained rate window reduces the sustained rate for comparison purposes but does not alter the real installation pace required to meet the plan. Recommendation(s) • **(Other)** Only use a standard “S” shaped work-off curve when evaluating the schedule duration viability.
CPC35	Observation(s) Bulk quantity installation curves reflect an overly aggressive plan when compared to Bechtel historical experience of peak sustained installation rates. Also, the separation of each commodity within the “family of curves” is not reflective of Bechtel historical experience. An example of this is the distance between the raceway and cable percent complete curves. The cable installation percent complete follows closely to the raceway installation percent complete. Historically, the more achievable plan reflects that a substantial portion of the installation of tray and conduit is

Table 5-1. Construction and Project Controls Observations and Recommendations	
No.	**Description**
	complete prior to the commencement of cable pulling. This separation allows for pulls from point to point without having to coil at each end. Having to coil the cable rather than pulling to its final location creates additional hours due to double handling. Recommendation(s) • **(Priority 1)** Create a new, more achievable, baseline Level 3 schedule. During development of the schedule, ensure appropriate time is allocated for bulk installation windows. • **(Priority 1)** Update the schedule forecast based on the median range of achievable peak sustained rates. • **(Priority 1)** Review quantities by system, and align to the schedule and start-up system waterfall. Prioritize bulks by system turnover demands. Balance this priority with area releases, and methods that would allow the highest productivity to be achieved. Compare system driven quantity curve against peak sustained rate forecast, and adjust accordingly. • **(Priority 1)** Plan work packages around the most productive methods of bulk installation (e.g., cable trees), with consideration for ability to support system turnovers.
CPC36	Observation(s) • During the review and analysis of the quantities provided by the Consortium, it was identified that the total quantity of aboveground conduit appears to be high compared to Bechtel historicals. • Inversely, the total quantity for cable appears to be low. These quantities were also reviewed from a ratio perspective and result in an overall ratio unlike any of Bechtel's past projects. Recommendation(s) • **(Priority 1)** Review the electrical quantities in the annex building and turbine building and update as needed. Revise the Level 2 and 3 schedules and also the bulk curves to align with the account for the new quantities.
CPC37	Observation(s) • The consortium project schedule is large and complex, forcing daily maintenance and status updates. Varying levels of the schedule are comingled in the same projects, and are loaded with varying degrees of resource data, resulting in duplication • The Level 1 schedule (as presented in the monthly project review meeting package) effectively highlights the critical path and major project activities on a single page. However, dates are only included for certain activities and a timescale is not provided, therefore target and forecast dates for other major activities are not clear. The schedule also appears to start in January 2015, showing no status of actual work completed prior to that date. • The Level 2 schedule is made up of "WBS summary" (work breakdown structure) type activities which are essentially hammock activities for all detailed activities within that WBS. This schedule provides a summary by unit, building, elevation, and commodity, and is fully resource loaded with jobhours through project completion. The Level 2 schedule appears to have many activities working in parallel, which isn't necessarily the case. When viewed at a lower level of detail, the Level 2 hammock (summary) activities capture all activities from fabrication through punch list and touch-up activities. In many cases, fabrication begins several months or more prior to installation, and there are also large gaps between bulk installation and final completion activities within a WBS (work breakdown structure). This approach skews the Level 2 activities

Table 5-1. Construction and Project Controls Observations and Recommendations	
No.	**Description**
	into much longer durations than when the bulk of the work is actually planned to be performed. Furthermore, as the Level 2 schedule is fully resource loaded, this approach is spreading those resources over a longer period of time, reducing the resulting peak manpower requirements. This can be problematic if the Level 2 schedule is the primary tool being utilized to determine manpower requirements. • The Level 3 schedule is the detailed working level schedule for the project. Development of this schedule is ongoing, and is currently being reviewed at 6 to 9 month durations beyond the data date. Due to the level of detail and number of activities in this schedule, this schedule is considered to be a Level 5 implementation schedule. Resources are being loaded in this schedule as well as some quantities, but do not appear to be complete enough to be used for forecasting purposes. The Consortium's project controls group is performing daily reviews of this schedule due to its large size and complexity, and the volume of changes being input on a day-to-day basis. The team has established a good process for managing the existing schedule, but daily updating and reviews are excessive for this size and scope of project. <u>Recommendation(s)</u> • **(Priority 2)** Adjust the Level 1 schedule to include a time-scaled baseline and target and forecast dates for all identified activities. Expand the start of the window schedule to show major project status since project inception. • **(Priority 1)** Create a Level 3 control schedule with no more than 5,000 activities per unit. The Level 2 schedule can be used at a starting point, but would need to be converted to "task" activities as opposed to "hammock activities". The Level 3 schedule should be at a sufficient level of detail to identify all critical interfaces between each phase of the project. The recommended structure is to identify construction activities by unit, building, elevation, area, and commodity. A custom data field should be added to identify systems associated with each activity, to ensure proper tie in from construction to startup. This schedule should be resource loaded with key quantities and jobhours and maintained/aligned to the current forecast for the project. Weekly meeting and management reviews should use this Level 3 schedule as opposed to lower level schedules. • **(Other)** Develop more detailed Level 5 implementation schedules as needed to manage near term commitments for critical areas. These can be in Excel rather than Primavera, and in addition to time-scaled format, can be in the form of a bingo-sheet, checklist, or other method to track status. Primavera is currently over-used for this level of the schedule, demanding more maintenance, update, meetings, etc., that strain project resources.

6. Startup

This section describes the assessment of the startup aspects of the project. Section 6.1 provides a summary of the current status. Section 6.2 provides startup observations and recommendations.

6.1 Current Status

6.1.1 Initial Test Program Organization

The Initial Test Program (ITP) is set up for an integrated organizational approach. The Owners have overall responsibility for the ITP; however, leadership has been delegated to the Consortium, and a WEC employee has been named the test director. The balance of the organization will be a mix of Owner and Consortium supplied personnel.

Reporting to the test director is the Component Test Group (CTG), currently led by a CB&I employee. The CTG will take turnover of systems from construction and conduct component testing. CTG test engineers will be discipline based and will specialize in the type of component tests related to his/her discipline (electrical, mechanical, control systems).

The test director leads the Preoperational Test Group (PTG). The PTG will take system turnovers from the CTG, conduct system start-up and tuning, and write and conduct system preoperational tests. Each PTG test engineer will be the point of contact for each of his/her assigned systems and will manage and execute all system-level testing activities. The project plan currently includes 155 to 160 systems and subsystems.

The Startup Test Group (STG) is also currently led by the test director. The STG will take system/facility turnover from the PTG and will support preparations for fuel load and the power ascension program.

The ITP organization is structured similarly to those used in many nuclear power plant facilities. There is a separation between component testing, system testing, and power ascension testing activities that will facilitate high confidence in the results of the test program. It is a program that integrates the Owner, NSSS supplier, and designer/constructor personnel to leverage the right resources to properly progress through component testing, preoperational testing, and power ascension.

In addition, the currently assigned test director has worked for many years in the nuclear power industry, with a significant track record in operation, outage management, and startup of nuclear power plants. This test director appeared well organized and to have a good grasp of the complexity of the project and how to approach it.

6.1.2 Test Program Integrity

a. Transition from Construction to the Initial Test Program

To separate the bulk construction program from the ITP, a formal turnover process will designate the official transfer of care, custody, and control from construction to the CTG. Boundary identification packages (BIPs) have been established to break the facility into smaller and more manageable blocks. There are currently about 555 BIPs that will be the basis for turning the facility equipment over to the CTG.

To provide further separation, performance of work activities will switch from the Consortium's QA program to the Owner's QA program. Subsequent construction access to systems transferred to the CTG will be controlled by a work authorization process controlled by the CTG. The work authorization process will provide for the release of work, ensure system configuration supports the nominated construction activity, and identify any required re-testing of components.

The above is intended to provide a high level of confidence that completed testing activities are not invalidated by unauthorized construction activities and are consistent with the approach used in many nuclear power plant facilities.

b. Preoperational Test Procedure Plan

All system preoperational tests will be treated as if they were safety related (i.e., a single development, review, approval, and performance process regardless of the safety significance of the test). The review plan also provides for a full NRC review cycle and a full Joint Test Working Group (JTWG) review/approval cycle prior to test performance and after performance (test results).

Preoperational test specifications are being developed to identify and collect all requirements to be included in each test procedure. The intent is to assemble the design requirements, system parameters, regulatory requirements, ITAAC commitments, and all acceptance criteria for each system. After each test specification is reviewed and approved, the system preoperational test procedure will be developed.

The above is intended to provide a high level of confidence that the preoperational test program adequately demonstrates the integrity of the systems installed in the plant.

c. Startup and Power Ascension Test Procedure Plan

Power ascension test procedures are similar for the new AP1000 units at V.C. Summer and Vogtle, and the Test Director is coordinating a combined effort to get the basic test procedures developed through a sharing of responsibility to develop the procedures. The total list was divided between the two sites. After each site develops its assigned tests, it should be a simple exercise to "localize" each of the procedures to ensure they become specific to each site.

d. Control Circuit Testing

To verify what has been installed is exactly per the project drawings, the CTG will verify control wiring “point to point” (cold checked) prior to being energized. After cold checking, the circuits will be energized and verified for functional correctness. Initial checks on the control loops may be conducted from remote stations since the current schedule does not suggest the control room will be ready. However, to meet the NRC regulatory guide requirement, those control loops initially verified from remote stations will be re-verified from the control room after it is available. This facilitates an earlier start of control loop functionality to support earlier equipment initial operation, as well as final verification to meet the stipulations in the regulatory guide.

e. Component Test Data Base

All component testing is to be tracked, planned, and statused using an Excel spreadsheet (Component Test Matrix) that is currently loaded from a manual takeoff of P&IDs, and it will be kept current through review of all changes issued by engineering. The spreadsheet includes planned durations of each activity, allows entry of actual durations, and calculates percent complete of each and cumulative activities (activity durations should not be confused with jobhours associated with each activity). Real-time updates of completed data records will be made manually on a daily basis, or as turned in to the admin doing the entry, for a reasonably current representation of progress/status. This is separate from the tracking of ITAAC activity progress.

A completions database is a typical, but critical, element in the control and management of the testing activities. What separates this from the typical completions databases is the ability to apply estimated durations to each activity, and use the results to support schedule development. Manloading and levelization of resources will still be performed in the commercial scheduling software.

6.1.3 Training of Operations and Maintenance Personnel

Training of permanent plant operations and maintenance personnel is the responsibility of the Owner. This was not specifically reviewed; however, it was briefly discussed during interviews with the ITP personnel. The current plan includes significant participation of the operations and maintenance personnel in the entire ITP, from component testing through preoperational testing. This is important to the preparation of the plant staff in their assumption of responsibility for system operation prior to fuel load and is consistent with the approach used in many nuclear power plant facilities.

6.1.4 Test Program Staffing

The current staffing plan has a peak (Unit 2/Unit 3 overlap) of 75 WEC test engineers, about 60 CB&I component test engineers, and about 25 Owner personnel. The staffing seems a little higher than the staffing needed based on previous preoperational and startup testing programs at

nuclear power plant facilities; however, historical dual unit plant startups were typically staggered 12 to 18 months apart, not the 8 to 9 months currently on the project schedule.

The test group will have a dedicated craft labor pool that comes out of construction. The WEC labor budget has been verified against the current staffing plan, while the CB&I budget has not yet been verified but is in progress.

6.1.5 Test Program Schedule

a. Schedule Development/Maturity

The component testing and preoperational testing schedules are developed to the point where prerequisite activities and associated ties are established, and the system-level fragnet templates have been loaded to each startup system. Additionally, standard activity durations have been plugged-in and the group is in the beginning phases of adjusting the durations per the Component Test Matrix and the estimated durations for preoperational tests based on complexity. It is too early to determine if the overall schedule duration will be consistent with the 17 to 18 months currently planned between energization and fuel load, as it may take 3 to 4 months to complete the adjustments and perform resource leveling exercises.

b. Construction Turnover to CTG

Review of the Construction to Component Test Group BIP turnover waterfall schedule indicates turnovers are planned to occur from September 2015 through January 2019; the distribution is as follows:

- 2015: 2 turnovers
- 2016: 44 turnovers (cumulative 46)
- 2017: 475 turnovers, 86% of total (cumulative 521, 94% of the total BIPs)
- 2018: 33 turnovers (cumulative 554)
- 2019: 1 turnover (Cumulative 555)

The current plan calls for 86% (or 475) of the BIPs to be turned over in 2017 alone, which is more than 30 BIPs per month. This is a high rate of turnovers that will be difficult to maintain. Even though the turnover process allows for consolidation of BIPs into fewer, larger turnover packages; this rate still indicates that 86% of the systems will be turned over to the CTG in a 12 month period.

This high number of turnovers produces a cumulative total of 94% at the end of 2017; yet, terminations are shown to be less than 70% complete in most areas. The turnover of completed BIPs does not seem to match the number of terminations completed, as it indicates that the last 6% of the BIPs contain over 30% of the terminations, which does not seem correct.

In addition, stringing the turnover of systems over a 31-month period may present problems. The concept of simultaneous operations, where bulk construction activities will be conducted in close proximity to components (and potentially systems) that will be energized and in testing introduces the concepts of Permit to Work (Energized Equipment Lockout/Tagout) and NFPA 70E , Standard for Electrical Safety in the Workplace (arc flash protection). This extends the period of time that poses safety risk to personnel and has a higher potential to slow installation of construction bulks and slip schedule. This can all be managed; but, a total turnover duration (first turnover to last turnover) of 18 to 20 months is more typical of nuclear power plant facilities.

The current project schedule indicates an approximate 9 month stagger between Unit 2 and Unit 3 hot functional tests. This is more aggressive than what was experienced on many past nuclear power plant facilities, which could preclude leveraging personnel from Unit 2 on Unit 3, as well as introducing the concept of two new units on the same site overlapping initial fuel load activities and initial power ascension.

6.2 Observations and Recommendations

Startup observations and recommendations are identified in Table 6-1.

Table 6-1. Startup Observations and Recommendations

No.	Description
S1	Observation(s) The current ITP staffing plan includes heavy Tech Staff, Operations, and Maintenance staff participation. Recommendation(s) • **(Other)** Be diligent with dedication of these resources to support the ITP. The hands-on experience acquired through participation in the test program is important to good performance during the early days of plant initial operation.
S2	Observation(s) The current schedule identifies about 8 months lag between the Unit 2 and Unit 3 hot functional tests. This lag is significantly shorter than previous dual unit nuclear sites, and drives the testing group staffing levels fairly high. Recommendation(s) • **(Priority 2)** Evaluate the likelihood of realizing an 8 month lag between Units 2 & 3. If realistic, ensure mitigations have been planned in case of events on one of the units while the other is in the vulnerable position of still in the testing phase. If not realistic, consider historical lags closer to 12 to 18 months.
S3	Observation(s) The construction turnover of BIPs to the CTG is planned to occur over a 31-month period. This is a long time to have equipment in various stages of testing and layup. Recommendation(s) • **(Priority 2)** Consider reducing the duration of the turnover period to 18 months. This may

Table 6-1. Startup Observations and Recommendations	
No.	**Description**
	permit reallocation of resources to complete systems in a more reasonable schedule, reduce the duration the facility would be in a simultaneous operations mode, and possibly reduce the cost of actually completing BIPs.
S4	Observation(s) The timing of construction completion of bulks does not align with the timing of BIP turnovers. At the end of 2017, construction plans to be less than 70% complete with terminations, yet, plans to have turned over 94% of the BIPs. Recommendation(s) • **(Other)** Reexamine construction terminations per cent complete compared to BIP turnovers and adjust the project schedule accordingly.
S5	Observation(s) The overall ITP organization and program are well thought out and follow proven philosophies and processes. Recommendation(s) • **(Other)** Continue along this execution plan and make modifications only if project or regulator changes warrant them.

7. Conclusions

The AP1000 is a first-of-a-kind technology, 10 CFR 52 is a new licensing process, and these are the first new nuclear plants being constructed in the U.S. in decades. Challenges would be expected.

However, the V.C. Summer Units 2 & 3 project suffers from various fundamental EPC and major project management issues that must be resolved for project success:

- While the Consortium's engineering, procurement, and construction plans and schedules are integrated, the plans and schedules are not reflective of actual project circumstances.
- The Consortium's project management approach does not provide appropriate visibility and accuracy to the Owners on project progress and performance.
- The Consortium's forecasts for schedule durations, productivity, forecasted manpower peaks, and percent complete do not have a firm basis.
- There is a lack of a shared vision, goals, and accountability between the Owners and the Consortium.
- The Consortium lacks the project management integration needed for a successful project outcome.
- The WEC-CB&I relationship is strained, caused to a large extent by commercial issues.
- The overall morale on the project is low.
- The Contract does not appear to be serving the Owners or the Consortium particularly well.
- The issued design is often not constructible resulting in a significant number of changes. The construction planning and constructability review efforts are not far enough out in front of the construction effort to minimize impacts.
- There is significant engineering and licensing workload remaining (currently over 800 engineers). ITAAC closure will be a significant effort.
- Emergent issues potentially requiring NRC approval of LARs remain a significant project concern.
- There is a significant disconnect between construction need dates and procurement delivery dates.
- The amount of stored material onsite is significant, creating the need for an extended storage and maintenance program.

- Construction productivity is poor for various reasons including changes needed to the design, sustained overtime, complicated work packages, aging workforce, etc.
- The indirect to direct craft ratio is high.
- Field non-manual turnover is high.
- The Owners do not have an appropriate project controls team to assess/validate Consortium reported progress and performance.
- The schedule for the startup test program is in the early stages of development. The BIP turnover rate appears to be overly aggressive.

The overall top priority recommendations from Bechtel's assessment that will significantly help to ensure the project is on the most cost efficient trajectory to completion are identified below:

- Owners – Develop an Owners' Project Management Organization (PMO) and supplement current Owner staff with additional EPC-experienced personnel. (O&R PM1)
- Owners and Consortium – Align Contract commercial conditions with the project goals and determine the realistic to-go forecast costs for project completion. (O&R PM4)
- Consortium – Remove the 50 mandatory constraints from the Integrated Project Schedule and allow the schedule to move based on the logic. Prioritize the development of mitigation/recovery plans based on their impact to the schedule. (O&R CPC25)
- Consortium – Ensure appropriate time is allocated for the installation of bulk commodities (large and small bore piping, pipe supports, cable tray, conduit, cabling). Confirm bulk quantities and update the schedule forecast based on the median range of achievable sustained installation rates. (O&Rs CPC5, CPC26, CPC35, CPC36, and CPC37)
- Consortium – Initiate a focused effort to complete WEC known engineering "debt". (O&Rs E2 and E9)
- Consortium – WEC engineering maintain focus on releasing the over 1,000 drawing holds that exist. (O&R E13)
- Consortium – Intensify the efforts of the Strategic Planning group, work package planning, constructability reviews, etc. to identify design changes needed well in advance of the construction need date. (O&Rs E7, CPC17, and CPC18)
- Consortium – WEC and CB&I engineering should get ahead of construction and incorporate E&DCRs into design drawings so that construction planning is simplified and takes less time. (O&R E10)

- Consortium – WEC engineering stay on top of emergent technical issues including maintaining focus on the increase in approved DCPs/Doc Pairs requiring closure. (O&R E9)
- Consortium – To improve craft productivity and retention, reduce the work week to no more than 48 hours (4-10s and 1-8 hours) and consider a craft incentive of $1/hour which would only be paid when a reduction in force occurs. (O&R CPC13)
- Consortium – Increase manual staffing levels to allow working of all available work areas. Evaluate methods to have the craftsmen spend more time at the workface. (O&Rs CPC16 and CPC24)
- Consortium – Simplify and streamline work packages. (O&Rs E2, P18, and CPC22)
- Consortium – Complete the inventory revalidation effort and establish a program to continually validate inventory. (O&R P5)
- Consortium – Expedite the implementation of blanket purchase orders. (O&R P8)
- Consortium – Complete the procurement schedule adherence effort to ensure equipment delivery dates meet construction need dates. (O&R P17)

Bechtel recognizes that the recently announced purchase of CB&I nuclear by WEC may change some of the recommendations regarding the Consortium. Nonetheless, most of the recommendations identified in this report still apply to the project under the new EPC contract structure.

Appendix A

Documents Received from the Owners and the Consortium

Appendix A
Documents Reviewed from the Owners and the Consortium

Documents reviewed during the assessment are identified in Table A-1.

Table A-1. Documents Reviewed During the Assessment

No.	Description	Hard Copy (HC) or Electronic (E)
1.1	VCS Project Supply Chain Management-Procurement Plan, VSG-GW-GPH-010), 5/8/15, 87 pages	E
1.1.1	VCS Project Construction Execution Plan (VSG-GW-GCH-001), Rev 2, 11/19/09, 64 pages	E
1.1.2	VCS Project Resource Staffing Plan, VSG-GW-GXH-001), 2/6/09, 11 pages	E
1.1.3	VCS Project Regulatory-Licensing Management Plan, (VSG-GW-G:H-001), Rev 5, 6/5/09, 14 pages	E
1.1.4	VCS Project Execution Plan (VSG-GW-GBH-300), Rev 3, 8/13/09, 52 pages	E
1.1.5	VCS Project Engineering Plan (VSG-GW-GEH-001), Rev 2, 1/18/12, 50 pages	E
1.1.6	VCS Project Completion and Closeout Plan (VSG-GW-GBH-370), Rev 1, 3/4/09, 19 pages	E
1.1.7	VCS Integrated Project Risk Management Plan (VSG-GW-GBH-310), Rev 1, 9/5/13, 10 pages	E
1.1.8	VCS ITAAC Program Execution Plan (VSG-GW-GLH-002), Rev 3, 1/12/15, 37 pages	E
1.1..9	NNDG-CS-0001 Rev. 5 - Oversight of Construction Activities (NNDG-CS-0001), Rev 5, 1/22/15, 8 pages	E
1.1.10	Project Oversight Strategy Plan, Rev. 2, 11/12/14,28 pages	E
1.1.11	NNDG-AP-0003 - Oversight Plan Development and Execution (NNDG-AP-0003), 6/11/14, 10 pages	E
1.1.12	NND-CS-0013 - Risk Assessment of Consortium Construction Activi-ties, 1/22/15, 9 pages	E
1.1.13	NND-QS-0006 Rev. 2 - NND QS Audits, Rev 2, 12/17/15, 40 pages	E
1.1.14	NND-CS-0013 Attachment 1 From Review 06-18-2015, 6/18/15,7 pages	E
1.1.15	NND-AP-0308 Rev. 0 - Construction Readiness Review Procedure, 5/29/14, 9 pages	E
1.1.16	NND-AP-0304 Rev. 1 - Construction Oversight, Rev 1, 4/30/13, 11 pages	E
1.1.17	NND-AP-0024 Rev. 3 - Assessment Program, Rev 3, 10/9/14, 83 pages	E
1.1.18	NND-AP-0018 Rev. 5 - Observation Program , Rev 5, 2/3/15,33 pages	E
1.1.19	AP1000 Initial Test Program - Commissioning Program and Turnover	E

Table A-1. Documents Reviewed During the Assessment		
No.	**Description**	**Hard Copy (HC) or Electronic (E)**
	Plan (VSG-GW-GBH-360), Rev 2) , 1/12/15,129 pages	
1.1.20	NND-AP-0002 Rev. 15 - Corrective Action Program (NND-AP-0002), Rev 15), 3/31/15,63 pages	E
1.2	V.C. Summer Units 2 & 3 Monthly Status Report - MARCH 2015, 107 pages	E
1.2.1	V.C. Summer Units 2 & 3 Monthly Status Report - JUNE 2015, 111 pages	E
1.2.2	V.C. Summer Units 2 & 3 Monthly Status Report - APRIL 2015, 116 pages	E
1.2.3	V. C. Summer Units 2 & 3 Monthly Status Report - MAY 2015, 112 pages	E
1.2.4	2015 07 16 - July PRM (final), 7/16/15,170 pages	E
1.2.5	2015 06 17 - June PRM Slides (Final), 6/18/15,181 pages	E
1.2.6	2015 05 21 - May PRM (final), 168 pages	E
1.2.7	2015 04 17 - April PRM (final as presented), 154 pages	E
1.2.8	2015 03 17 - March PRM (final), 154 pages	E
1.3	June 2015 Consortium Monthly Meeting Minutes, 6-18-15, 103 pages	E
1.3.1	May 2015 Consortium Project Review Meeting Minutes, 6-17-15, 97 pages	E
1.3.2	May 2015 Project Review Meeting Minutes - Owner Comments, 5-21-15, 7 pages	E
1.3.3	March 2015 Project Review Meeting Minutes - Owner Comments, 3/19/15, 8 pages	E
1.3.4	March 2015 Consortium Project Review Meeting Minutes, 4/8/15, 88 pages	E
1.3.5	June 2015 Project Review Meeting Minutes - Owner Comments, 6/18/15, 9 pages	E
1.3.6	June 2015 Consortium Project Review Meeting Minutes, 7/14/15, 103 pages	E
1.3.7	April 2015 Project Review Meeting Minutes - Owner Comments, 4/16/15, 8 pages	E
1.3.8	April 2015 Consortium Project Review Meeting Minutes, 90 pages	E
1.5	VC Summer Site Overall Craft Staffing (Includes Absenteeism and PF) dated 5/5/2015, 1 pages, 11 X 17	HC
1.5.1	VC Summer Site Overall Craft Forecast and Actuals, dated 8/27/15, 1 pages, 11 X 17	HC
1.5.2	Power Leadership_CBI_as of Jan 2015, 1 page	E
1.5.3	NND Staffing_8-15 (Owner Staffing), 2 pages	E
1.6	Westinghouse Engineering org charts for VCS Assessment, 6-1-15, 7 pages	E
1.6.1	NP&MP Org Charts for VCS Assessment – 6-1-15, 8 pages	E

Table A-1. Documents Reviewed During the Assessment		
No.	**Description**	**Hard Copy (HC) or Electronic (E)**
1.6.2	Westinghouse Nuclear Automation org charts for VCS Assessment - July 28, 2015, 8 pages	E
1.6.3	VC Summer Site Org Chart - CB&I - Jan 2015, 1/29/15,16 pages	E
1.6.4	Westinghouse Nuclear Automation org charts for VCS Assessment - July 28, 2015, 8 pages	E
1.6.5	Westinghouse Engineering org charts for VCS Assessment - July 28, 2015, 7 pages	E
1.6.6	WEC VCS Org Chart - Site 07-28-15, 1 page	E
1.6.7	Power_Leadership_CBI_2015.7.15, 1 page	E
1.6.8	NP&MP Org Charts for VCS Assessment, 6/1/15,22 pages	E
1.6.9	NP&MP Org Charts for VCS Assessment - July 28, 2015, 22 pages	E
1.7	Calendar of Weekly/Monthly Meetings (w/Owner attends highlighted), 3 pages, 8.5 X 11	HC
1.8	Top 17 Risks – Mitigation Plans (As of August 3, 2015; VC Summer Schedule Risk Register, dated 8/5/15, 14 pages, , 8.5 X 11	HC
1.8.1	VCS Items Meeting, dated 9/4/15,9 pages, , 8.5 X 11	HC
1.8.2	VC Summer Plan of the Day – 9/3/15, 36 pages, PowerPoint , 8.5 X 11	HC
2.1	Design Completion (Luca Oriani, Westinghouse), 5 pages, 8.5 X 11	HC
2.3.1	WEC PCC Level 1 Critical Issues List, 3 pages, 11 X 17	HC
2.3.2	Issues List, dated 9/4/15, 5 pages, 8.5 X 11	HC
2.8.	Pending DCP List, 9/3/15, 4 pages, 8.5 X 11	HC
2.8.1	VC Summer LAR Cross Reference, 9/10/15, 18 pages, PowerPoint 8.5 X 11	HC
2.8.2	Overview of the AP1000 Design Change Process, dated 1/14/15, 18 pages, PowerPoint , 8.5 X 11	HC
2.9	AP1000 Plant Major Milestones, 28 pages, PowerPoint 8.5 X 11	HC
2.9.1	P&ID Revisions (P2P, 8/31/15), 10 pages, 11 X 17	HC
3.2	Weekly Modules 4-Box Report - 07-14-15 Rev. 1, 37 pages	E
4.1	VCS 2 & 3 Weekly Construction Metric 15-07-27, 58 pages	E
4.2.1	Unit 3 Total CB&I Commodity Percents Complete (graph), dated 9/3/15, 3 pages, 11 X 17	HC
4.2.2	VC Summer Site Total CB&I Percents Complete (graph)	HC
4.2.3	Unit 2 CB&I Commodity Percents Complete	HC
4.3	VCS Project Subcontracting Strategy – Report, dated 8/31/15, 17 pages, 11 X 17	HC
4.4	VC Summer Daily Report 7 21 2015, 7/21/15,6 pages	E
4.5	VC Summer Equipment List, 25 pages, 8.5 X 11	HC
5.1	2015-08-03 Month End U3 Integrated Calc Major Milestone-Key Dates, 8/6/15, 1 page	E
5.1.1	2015-08-03 Month End U2 Integrated Calc Major Milestone-Key	E

Table A-1. Documents Reviewed During the Assessment		
No.	**Description**	**Hard Copy (HC) or Electronic (E)**
	Dates, 8/6/15, 1 page	
5.1.2	2015-06-29 Month End U3 Integrated Calc Major Milestone-Key Dates, 7/7/15, 1 page	E
5.1.3	2015-06-29 Month End U2 Integrated Calc Major Milestone-Key Dates, 7/7/15, 1 page	E
5.1.4	2015-06-01 Month End U3 Integrated Calc Major Milestone-Key Dates, 6/5/15, 1 page	E
5.1.5	2015-06-01 Month End U2 Integrated Calc Major Milestone - Key Dates, 6/5/15, 1 page	E
5.1.6	2015-04-27 Month End U2 Integrated Calc Major Milestone-Key Dates, 4/28/15,1 page	E
5.1.7	2015-04-27 Month End U3 Integrated Calc Major Milestone-Key Dates, 4/28/15, 1 page	E
5.1.8	2015-03-30 Month End U3 Integrated Calc Major Milestone-Key Dates, 4/9/15, 1 page	E
5.1.9	2015-03-30 Month End U2 Integrated Calc Major Milestone-Key Dates, 4/9/15,1 page	E
5.2	2015-08-03 U3 Crit Path ILRT, 8/5/15, 4 pages	E
5.2.1	2015-08-03 U3 Crit Path COD, 8/5/15, 4 pages	E
5.2.2	2015-08-03 U2 Crit Path ILRT, 8/5/15, 4 pages	E
5.2.3	2015-08-03 U2 Crit Path COD, 8/5/15, 5 pages	E
5.2.4	2015-06-29 U3 Crit Path ILRT, 6/30/15, 4 pages	E
5.2.5	2015-06-29 U3 Crit Path COD, 7/7/15,4 pages	E
5.2.6	2015-06-29 U2 Crit Path ILRT, 6/29/15,3 pages	E
5.2.7	2015-06-29 U2 Crit Path COD, 7/7/15,4 pages	E
5.2.8	2015-06-01 U3 Crit Path COD, 6/3/15,4 pages	E
5.2.9	2015-06-01 U3 Crit Path ILRT, 6/4/15, 4 pages	E
5.2.10	2015-06-01 U2 Crit Path ILRT, 6/3/15,3 pages	E
5.2.11	2015-06-01 U2 Crit Path COD, 6/2/15,6 pages	E
5.2.12	2015-04-27 U3 Crit Path ILRT, 4/30/15,4 pages	E
5.2.13	2015-04-27 U3 Crit Path COD, 4/30/15,5 pages	E
5.2.14	2015-04-27 U2 Crit Path ILRT, 4/30/15,5 pages	E
5.2.15	2015-04-27 U2 Crit Path COD, 4/30/15,4 pages	E
5.2.16	2015-03-30 U3 Crit Path ILRT, 4/6/15,4 pages	E
5.2.17	2015-03-30 U3 Crit Path COD, 4/6/15, 4 pages	E
5.2.18	2015-03-30 U2 Crit Path ILRT, 4/1/15, 4 pages	E
5.2.19	2015-03-30 U2 Crit Path COD, 4 pages	E
6.1	QA Audits at VC Summer 2014/2015, 1 page, 8.5 X 11	HC
6.1.1	Quality Assurance Scheduled Surveillances, dated 8/26/15, 18 pages, 8.5 X 11	HC

Table A-1. Documents Reviewed During the Assessment		
No.	**Description**	**Hard Copy (HC) or Electronic (E)**
6.5	NND-AUD-201503 Owner's COL and Project Oversight Audit, 7/2/15,16 pages	E
6.5.1	NND-15-0247 2015 Corrective Action Program Audit Report, 4/16/15,9 pages	E
6.5.2	NND-15-0143 Parallel Module Fabrication Process Audit Report, 3/24/15,8 pages	E
6.5.3	NND-15-0090 2015 Procurement Processes Audit Report, NND-AUD-201501, 2/20/15,8 pages	E
6.5.4	2015 Audit Schedule Rev. 1, 6/12/15,2 pages	E
7.1	Licensing Weekly 8-3-15, 10 pages	E
7.1.1	Licensing Weekly 8-10-15, 10 pages	E
7.1.2	Licensing Weekly 7-6-15, 11 pages	E
7.1.3	Licensing Weekly 7-27-15, 10 pages	E
7.1.4	Licensing Weekly 7-20-15, 10 pages	E
7.1.5	Licensing Weekly 7-13-15, 10 pages	E
7.1.6	Licensing Weekly 6-8-15, 11 pages	E
7.1.7	Licensing Weekly 6-29-15, 12 pages	E
7.1.8	Licensing Weekly 6-15-15, 11 pages	E
7.1.9	Licensing Weekly 6-22-15, 11 pages	E
7.1.10	Licensing Weekly 6-1-15, 11 pages	E
7.2.11	2015-08-10 VC Summer NRC Schedule, 3 pages	E
7.2.12	2015-08-03 VC Summer NRC Schedule, 3 pages	E
7.2.13	2015-07-27 VC Summer NRC Schedule, 3 pages	E
7.2.14	2015-07-20 VC Summer NRC Schedule, 3 pages	E
7.2.15	2015-07-13 VC Summer NRC Schedule, 3 pages	E
7.2.16	2015-07-06 VC Summer NRC Schedule, 3 pages	E
7.2.17	2015-06-29 VC Summer NRC Schedule, 3 pages	E
7.2.18	2015-06-22 VC Summer NRC Schedule, 3 pages	E
7.2.19	2015-06-15 VC Summer NRC Schedule, 3 pages	E
7.2.20	2015-06-08 VC Summer NRC Schedule, 3 pages	E
7.2.21	2015-06-01 VC Summer NRC Schedule, 3 pages	E
7.4	VCS Permit Status 6-11-15, 5 pages	E
7.8	NRC Report 8-4-15, 8/4/15,3 pages	E
7.8.1	NRC Report 7-7-15, 7/7/15,3 pages	E
7.8.2	NRC Report 7-21-15, 7/21/15,3 pages	E
7.8.3	NRC Report 7-14-15, 7/14/15,3 pages	E
7.8.4	NRC Report 6-9-15, 6/9/15,3 pages	E
7.8.5	NRC Report 6-2-15, 6/2/15,3 pages	E

Table A-1. Documents Reviewed During the Assessment		
No.	**Description**	**Hard Copy (HC) or Electronic (E)**
7.8.6	NRC Report 6-16-15,6/16/15,3 pages	E
7.8.7	NRC Report 5-5-15, 5/5/15,3 pages	E
7.8.8	NRC Report 5-19-15, 5/19/15,3 pages	E
7.8.9	NRC Report 5-13-15, 5/13/15,3 pages	E
8.1	Engineering, Procurement and Construction Agreement between SCE&G, for Itself and as Agent for the SC Public Service Authority, as owner and a Consortium consisting of Westinghouse Electric Company LLC and Stone & Webster, Inc., as Contractor for AP1000 Nuclear Power Plants Dated as of May 23, 2000 (Confidential Trade Secret Information – Subject to Restricted) dated 5/23/08 (176 pages, 8.5 X 11)	HC
9.1.1	Owner Org Charts - Bechtel Assessment, 1 page	E
9.1.1.2	Owner Org Charts - Bechtel Assessment, 14 pages	E
9.3	Exhibit A, Scope of Work/Supply and Division Responsibility, 62 pages, 8.5 X 11	HC
9.3.1	AP1000 Plant Division of Responsibility – VC Summer 2&3 (VSG-GW-G8Y-100), 70 pages, 8.5 X 11	HC
10.1	Commercial Review Meeting, dated 8/19/15, 7 pages, PowerPoint 8.5 X 11	HC
10.2	Unit 3 Standard Plant Performance (Month end July 2015), 1 page, 11 X 17	HC
10.12	VC Summer U0 CSI Site-Specific EPC, dated 9/7/15, 3 pages, 11 X 17	HC
11.2	Modules Illustration, 1 page, 8.5 X 11	HC
11.2.1	AP1000 Module Overview NI Structural Modules, 166 pages, PowerPoint 8.5 X 11	HC
11.27	Project Controls Meeting Material (9/15 Meeting), 15 pages, 11X17	HC
12.1	VC Summer Plan of the Day, October 01, 2015, 33 pages, PowerPoint 8.5 X 11	HC
12.2	Nuclear Island Mechanical Systems Reference Document Package,AP1000, May 2015 (Includes General Arrangements, Room Numbering and Module Locations, 79 pages, 11X17	HC
12.3.1	Un-redacted Article 3 added (9/25/15) Un-redacted Article 7 added (9/25/15), but related Exhibit J, not added. Un-redacted Article 9 and 10 added (9/25/15) - Schedule E, project schedule – not added - Schedule F, milestone schedule – not added - Schedule J, price adjustment provisions – not added	HC
12.3.2	Agreement Change Order 1 – 7/14/08, Engineering, Procurement and Construction Agreement, 8 pages, 8.5 X 11	HC
12.3.3	Agreement Change Order 2 – 9/10/09 (provision of Limited Scope Simulators, LSS) 12 pages, 8.5 X 11	HC

Table A-1. Documents Reviewed During the Assessment		
No.	**Description**	**Hard Copy (HC) or Electronic (E)**
12.3.4	Agreement Change Order 3 – 1/14/10, Parr Road Rehabilitation, 27 pages, 8.5 X 11	HC
12.3.5	Agreement Change Order 5 – 5/4/10, Revised Senior Reactor Operator Instructor Training Program, 37 pages, 8.5 X 11	HC
12.3.6	Agreement Change Order 6 – 6/29/10, (substitute HydraNuts ILO AP1000 Standard Plant reactor vessel stud tensioners . . .), 14 pages, 8.5 X 11	HC
12.3.7	Agreement Change Order 7 – 7/1/10, (Stone & Webster . . . .), 9 pages, 8.5 X 11	HC
12.3.8	Agreement Change Order 8 – 4/11/11, (transfer Stone & Webster Target Price COW to Firm Price . . .), 51 pages, 8.5 X 11	HC
12.3.9	Agreement Change Order 9 – 11/23/10, (RFP to reconfigure outgoing transmission lines from VCS#2 switchyard . . .), 5 pages, 8.5 X 11	HC
12.3.10	Agreement Change Order 10 – 11/22/10, Access to Westinghouse Primavera Architecture, 12 pages, 8.5 X 11	HC
12.3.11	Agreement Change Order 11 – 2/14/11, Study and Analyze the Impact of Delayed COL. Receipt of Construction Schedule, 8 pages, 8.5 X 11	HC
12.3.12	Agreement Change Order 12 – 12/8/11, Impa ct from Health Care and Education Reconciliation Act of 2010, 12 pages, 8.5 X 11	HC
12.3.13	Agreement Change Order 13 – 2/14/12, Ovation Work Stations. 4 pages, 8.5 X 11	HC
12.3.14	Agreement Change Order 14 – 2/26/12, Cyber Security Phase 1, 53 pages, 8.5 X 11	HC
12.3.15	Agreement Change Order 15 – 2/16/12,WLS Discharge Piping, 4 pages, 8.5 X 11	HC
12.3.16	Agreement Change Order 18 – 9/17/14, Perch Guards, 6 pages, 8.5 X 11	HC
12.3.17	Agreement Change Order 19 – 10/1/14, Simulator Hardware/Software/Training, 11 pages, 8.5 X 11	HC
12.3.18	Agreement Change Order 20 – 12/2/14, Method of Calculating ACA Impact 2011, 2012, 2013, 8 pages 8.5 X 11	HC
12.3.19	Agreement Change Order 21 – 2/16/15, ITAAC Maintenance, 8 pages, 8.5 X 11	HC
12.3.20	Agreement Change Order 22 – 7/30/15, Common-Q Maintenance Training System Equipment and Software, 31 pages, 8.5 X 11	HC
12.3.21	Agreement Change Order 23 – 8/5/15, Simulator Development System (SDS), 64 pages, 8.5 X 11	HC
12.3.22	Agreement Change Order 24 – 8/20/15, 94 pages, 8.5 X 11	HC
12.5	Field Fabrication and Installation Specification, 3.9 Installation of Spool Pieces and Field Fabricated Piping/Training, 6 pages, 8.5 X 11	HC
12.5.1	Piping Isometric General Notes, Dwg. No. APP-GW-P_W-100, 1 page, 11 X 17	HC

Table A-1. Documents Reviewed During the Assessment		
No.	**Description**	**Hard Copy (HC) or Electronic (E)**
12.5.2	Piping Isometric Symbol Legend, Dwg No. APP-GW-PLW-102, 1 page, 11 X 17	HC
12.5.3	Shield Building Stell Wall Panels EL 100-0" to 248'-6 1/2 " General Notes, Sheet 1 & 2, 11 X 17	HC
12.5.4	AP1000 Structural Modules General Notes Dwg No. APP-GW-S9-100 through 107, 7 pages, size 11X17	HC
12.5.5	General Notes Mechanical Modules (Dwg No. APP-GW-K9-100 through 103, 4 pages, size 11X17	HC
12.9	Westinghouse Home Office Engineers not charging/charging VC Summer Project, 1 page, size 8.5 X 11	HC
12.9.1	CB&I Total Head Count for Design Engineering and Support, 1 page, size 8.5 X 11	HC
12.10	Historical and Open E&CDRs and N&Ds,4 pages, size 8.5 X 11	HC
12.13	Cives CGD Submittal Review Status, 1 page, 8.5 X 11	HC
12.15	Site Overall Total, Direct Construction Only (Planned and Earned Hours) curve, 1 page, 11X17	HC
12.17	VC Summer Total Steel Commodity, 7 pages, 11X17	HC
12.21	CB&I Direct Construction Labor Summary, dated May, 2015, 1 page, 11X17	HC
12.23	Available Work Assuming No Manpower Constraints (table), 1 page, 8.5 X 11	HC
12.24	VC Summer Initial Test Program Unit 2 & 3, Target Completion Schedule, 1 page, 11X17	HC
12.26	EBS_NND_ Daily Active Detail, 7 pages, 8.5 X 11	HC
12.28	ROS Impacts Report, 6 pages, 11X17	HC
12.29	Engineering Impacts Report, 1 pages, 8.5 X 11	HC
13.1	Westinghouse Engineering Remaining Schedule (2015-09-28), 135 pages, 8.5 X 11	HC
13.7	WEC PO Status report, 1 page, 8.5 X 11	HC
13.9	Corrective Action Program Status (CAPS) Report, dated 9/17/15, 19 pages, 8.5 X 11	HC
14.2	Indirect Cost Review, 22 pages, 8.5 X11	HC
14.3	Indirect/direct hours Week Ending 08-16-15 (Indirect Labor Report), 4 pages, 8.5 X 11	HC
15.6	Summary of the key engineering activities in the ECS remaining in the schedule that have a tie to construction, 1 page, 8.5 X 11	HC
15.6.1	Post-Engineering Design Closure Work Streams, 1 page, 8.5 X 11	HC
15.6.2	Engineering Items – ROYG (2015 – 09-28), pages 1 – 70, 11X17	HC
15.6.3	Procurement Items – ROYG (2015-09-28) pages 1-128, 11X17	HC
15.6.4	Licensing Items - ROYG (2015-09-28) pages 1-12, 11X17	HC
15.7	Engineering Resources, 1 page, 8.5 X 11	HC

Table A-1. Documents Reviewed During the Assessment		
No.	**Description**	**Hard Copy (HC) or Electronic (E)**
15.9	VC Summer Discussion on I&C Schedule & PRS – July 2015, 10 pages	HC
15.9.1	I&C Baseline 8 Engineering Remaining, 51 pages, 8.5 X 11	HC
15.11	Annex Building Cable Tray Plan Area EL 100' – 0", Sheet 2 of 2, Dwg No. APP4031-ER-013, 1 page, 11X17	HC
15.11.1	Annex Building Cable Tray Support Location Plan Area 1 & Area 4 EL 100' – 0" Sheet 2 0f 3, Dwg No. APP4031-SH-014, 1 page, 11X17	HC
15.11.2	Annex Building Cable Tray Support List & Fabrication Details Area 1, EL 100'-0" Sh 1 of 3 Dwg No. APP-4031-SHX-01201, 1 page, 11X17	HC
15.11.3	Annex Building Cable Tray Support List & Fabrication Details Area 1, EL 100'-0" Sh 2 of 3, Dwg No. APP-4031-SHX-01301 1 page, 11X17	HC
15.11.4	Annex Building Cable Tray Support List & Fabrication Details Area 1, EL 100'-0" Sh 3 of 3, Dwg No. APP-4031-SHX-01401 1 page, 11X17	HC
15.11.5	Fabrication Requirements Cope Tray Supports Seismic Category III Trapeze Rod Support Detail, Dwg No. APP-SH27-VF-201, 1 page, 11X17	HC
15.11.6	Annex Building – Area 4 Structural Steel Roof Supplemental Steel Plan, Dwg No. AP-4044-SS-005, 1 page, 11X17	HC
15.13	Remaining Hold DDs, 37 pages, 1 page 8.5 X 11, 36 pages 11 X 17	HC
15.13 – 15.14	Hold Docs missing DD, 3 pages, 11 X 17	HC
15.16	CB&I Remaining Equipment Deliveries, 100 pages, 11X17	HC
15.16.1	Westinghouse Remaining Equipment Deliveries, 17 pages, 11X17	HC
16.1 – 16.6	List – Construction Package – On Hold, 3 pages, 11X17	HC
16.1 – 16.6.1	VC Summer Unit -2 Auxiliary Building Room Plan 12306, Strategic Planning Team September 14, 2015 (DRAFT), dated 9/14/15, 13 pages, 8.5 X 11	HC
16.1 – 16.6.2	Email (fr James B. Kelly to Con Matthews dated 9/24/15, Subject: Drawings required for Electrical cable tray supports with APP-GW-GBH-451, Rev 0, AP1000 Standard Plant Engineering Document List – Annex Building Areas 1, 2, 3 – Raceways and Supports Construction Deliverables – Elevation 100' to 117'6" (AN2-RC-X) 15 pages, 8.5 X 11	HC
16.1 – 16.6.3	Annex Building Cable Tray Plan Area 1 El. 100' -0" Sheets 1 o f3, Dwg No. APP-4031-ER-012, 1 page 11X17	HC
16.1 – 16.6.4	Liquid Radwaste System, Auxiliary Building Room 12259, Annulus Pipe Chase, Dwg No. APP-WLS-PLW-451, 1 page, 11X17	HC
16.1 – 16.6	Pipe Support Drawing WLS System, Dwg No. APP-WLS-PH-12R00891, 1 page, 11X17	HC
16.1 – 16.6.5	Shield Building Lower Annulus Inside Embedments Development View Radius 69'-6" (Sheet 1), Dwg No. APP-1020-CE-100, 1 page, 11X17	HC
16.1 –	Shield Building Lower Annulus Inside Embedments Index Develop-	HC

Table A-1. Documents Reviewed During the Assessment		
No.	**Description**	**Hard Copy (HC) or Electronic (E)**
16.6.6	ment View Radius 69'-6" (Sheet 1), Dwg No APP-1020-CEX-100, 1 page, 11X17	
16.1 – 16.6.7	Shield Building Lower Annulus Inside Embedments Index Development View Radius 69'-6" (Sheet 2), Dwg No APP-1020-CEX-102, 1 page, 11X17	HC
16.1 – 16.6.8	Shield Building Lower Annulus Inside Embedments Index Development View Radius 69'-6" (Sheet 4), Dwg No APP-1020-CEX-104, 1 page, 11X17	HC
16.1 – 16.6.9	Standard Embedment Plates Deformed Wire Anchor (DWA) Type, Dwg No APP-CE01-CE-002, 1 page, 11X17	HC
16.2/3	Overall Modules Response status, 11 pages, 8.5 X 11	HC
16.10	RBL (APP), RBL (CPP), Support Qualification, # Supports Qualified by month, 2 pages, 8.5 X 11	HC
17.2	VCS Unit 2 – Construction T/O to Component Test (Waterfall), 13 pages, size 8.5 X 11	HC
17.2.1	VCS Unit 1 - Service Water – Service Water Initial Test Program, 1 page, size 11 X 17	HC
17.3	EDCR Listing – from 4/30/15 to 10/1/2015, 10 pages, 8.5 X 11	HC
17.3.1	CBI EDCR Listing - pages 1 to 108, 8.5 X 11	HC
17.4	WEC – CBI Staffing Summary Table, 1 page, 8.5 X 11	HC
17.5 (2.9)	Weekly ECS Report Out, 9/30/15, 48 pages, 8.5 X 11	HC
17.6	Monthly Engineering Completion Status Meeting, September 9th, 2015, 22 pages, PowerPoint, size 8.5 X 11	HC
17.6.1	Monthly Engineering Completion Status Meeting, October 7, 2015, 24 pages, PowerPoint, size 8.5 X 11	HC
17.7 (2.3)	Level 1 Issue Executive Summary Report, 2 pages, 8.5 X 11	HC
17.8	CB&I 1X4 POs Released, 3 pages,	HC
17.9	CBI To-Go POs, 1 page, 8.5 X 11	HC
17.10	Standard Plant ITAAC 2.3 06.09b.iv Performance Documentation Plan (Doc. No. APP-RNS-ITH-004), 11 pages, size 8.5 X 11	HC
17.10.1	Standard Plant ITAAC 2.2 02.02a Performance Documentation Plan (Doc. No. APP-PCS-ITH-014), 13 pages, size 8.5 X 11	HC
17.10.2	Standard Plant ITAAC 2.1 02.11b.iii Performance and Documentation Plan (Doc No APP-RCS-ITH-048), 12 pages, size 8.5 X 11	HC
17.10.3	Standard Plant ITAAC 2.1 02.08b Performance and Documentation Plan (Doc No APP-RCS-ITH-056), 13 pages, size 8.5 X 11	HC
17.10.4	Standard Plant ITAAC 2.1 02.08d.vii Performance and Documentation Plan (Doc No APP-RCS-ITH-060), 10 pages, size 8.5 X 11	HC
19.2	Work Package Review Task Team, 3 pages, 8.5 X 11	HC

Table A-1. Documents Reviewed During the Assessment		
No.	**Description**	**Hard Copy (HC) or Electronic (E)**
--	CBI AP1000 Strategic Planning Team – Unincorporated DCP Report, 5 pages, 8.5 X 11	HC
--	VCS Monthly Project Review Meeting, September 17, 2015, 156 pages, PowerPoint 8.5 X `11	HC
--	VCS Site Design Engineering Drawing Booklet (1), System P&IDs & Electrical One-lines, 321 pages, 11X17	HC
--	VCS Plan of the Day - 9-9-15, 35 pages	E
--	VC Summer Units 2 & 3 Project Assessment Consortium Meeting (Presentation), dated 9/9/15, (2 Copies), 131 pages, PowerPoint 8.5 X 11	HC
--	VC Summer Nuclear Station Units 2 and 3 Updated Final Safety Analysis Report , Chapter 1 (Rev 3) 8.5 X 11 (Large packet)	HC
--	VC Summer – Site Specific Engineering Schedule – Remaining (Sorted by System /Major Sequence) Data Date: 28-Sep-15, CB&I – 200 pages, 11X17	HC
--	AP1000 Domestic Design Finalization – CBI Std Plant – DOM DF – To GO Engineering, 157 pages, 11X17	HC
--	E&DCR Title: Requalification of KOPEC conduit supports at Elevation 66'-6" Area 2, E&DCR No. APP-1212-GEF-087, Rev 0., 25 pages, 8.5 X 11	HC
--	VC Summer Nuclear Station Units 2 and 3 Updated Final Safety Analysis Report , Chapter 3 (Rev 3) , 8.5 X 11 (Large packet)	HC
--	VCS Schedule - WEC PM Milestones, 4 pages	E
--	VCS Schedule - WEC PM Milestones, 6 pages	E
--	VCS Schedule - Module Assembly Summary, 1 page	E
--	VCS Schedule – Licensing, 44 page	E
--	VCS Schedule - ITAAC Detail, 137 pages	E
--	VCS Level 1 - Construction Schedule, 3 pages	E
--	VCS Schedule - Module Procurement Detail, 8/25/15,55 pages	E
--	VCS Schedule - Module Procurement Summary, 8/25/15, 6 pages	E
--	VCS Schedule - Module Procurement, 51 pages	E
--	VCS Schedule - NAC Detail, 8/30/15,40 pages	E
--	VCS Schedule - NAC Summary, 2 pages	E
--	VCS Schedule – NAC, 8/30/15,53 pages	E
--	VCS Schedule - Panel Delivery Detail, 26 pages	E
--	VCS Schedule - Panel Delivery Summary, 8/25/15,2 pages	E
--	VCS Schedule - Panel Delivery, 8/25/15,26 pages	E
--	VCS Schedule - Procurement Detail, 8/25/15,323 pages	E
--	VCS Schedule - Procurement Summary, 8/25/15, 9 pages	E
--	VCS Schedule - Procurement WES Detail, 8/25/15,158 pages	E

Table A-1. Documents Reviewed During the Assessment		
No.	**Description**	**Hard Copy (HC) or Electronic (E)**
--	VCS Schedule - Procurement WES Summary, 8/25/15, 12 pages	E
--	VCS Schedule - Procurement WES, 127 pages	E
--	VCS Schedule – Procurement, 261 pages	E
--	VC Summer EPC Agreement, 5/23/15,176 pages	E
--	Meeting Sign in, Consortium 9-9-15 Presentation , 3 pages	E
--	September 9 Presentation Draft Agenda, 2 pages	E
--	CBI Meeting Schedule – 9-9-1515, 3 pages	E
--	Weekly Site Safety Units 2 and 3 Report 9-21-15 28 pages	E
--	VCSummer Supply Chain Management Org Chart 9-21-15, 1 page	E
--	VCSumer Plan of the Day 9-21-15, 26 pages	E
--	Turbine Building Pipe Summary - Large and Small Bore 1-3-12, 1 page	E
--	Backfill Plan for Nuclear Island, 2 pages	E
--	Aux Building Elevations, 20 pages	E
--	9-21-15 Module Discussion Attendance Sheet, 9/21/15,1 page	E
--	VCS Modules Meeting - 9-15-154 pages	E
--	4-Box Report - Modules - 9-15-15, 42 pages	E
--	VC Summer Plan of the Day 9-22-15, 36 pages	E
--	VC Summer P6 database structure, 1 page	E
--	VC Summer P6 Info, 12 pages	E
--	SCEG Personnel Reporting Up Through Ron Jones, 2 pages	E
--	Construction Performance Meeting 9-13-15, 31 pages	E
--	Org Chart - Confidential - Do Not Share Outside Bechtel, 1 page	E
--	9-14-15 LAR 30 & LAR 111 Schedule, 4 pages	E
--	9-15-15 McIntyre Email on CAP and DCP Status, 2 pages	E
--	9-15-15 ITAAC Letter, 3 pages	E
--	9-17-15 U3 Overview Schedule, 1 page	E
--	9-17-15 U2 Overview Schedule, 1 page	E
--	9-17-15 Monthly Meeting Action Items List, 19 pages	E
--	9-17-15 Monthly Meeting Agenda, 1 page	E
--	2015 09 22 - Bechtel Assessment - Document Request - Tracking Document, 17 pages	E
--	2015 09 22 - Bechtel Assessment - Document Request - Tracking Document (3), 17 pages	E
--	2015 09 04 - Bechtel Assessment - Document Request - Tracking Document-Rev 1 – SG, 17 pages	E
--	2015 08 24 - Bechtel Assessment - Document Request - Tracking Document, 12 pages	E

Table A-1. Documents Reviewed During the Assessment		
No.	**Description**	**Hard Copy (HC) or Electronic (E)**
--	2015 08 18 - Bechtel Assessment - Document Request - Tracking Document, 11 pages	E
--	Bechtel Assessment of V. C. Summer Units 2 & 3 - 8-12-15 Supplemental Request for Schedule Related Information, 2 pages	E
--	2015 08 03 - Bechtel Assessment - Document Request - 8-7-15 Comments, 16 pages	E
--	VCS Document Request List, 2 pages	E
--	2015 09 23 - Bechtel Assessment - Document Request - Tracking Document, 17 pages	E
--	VC Summer aerial photo taken 6-30-15, 1 page	E
--	WEC Engineering Status Meeting 9-25-15, 1 page	E
--	WEC Engineering Follow-up Meeting 9-28-15, 1 page	E
--	VC Summer Plan of the Day 9-24-15, 38 pages	E
--	Work Control Document Control Mtg 9-24-15, 1 page	E
--	VC Summer Plan of the Day 9-23-15, 35 pages	E
--	VCS Schedule – Bab Follow, 45 pages	E
--	VCS Schedule – Engineering Milestones (Gap file), 123 pages	E
--	VCS Schedule – Fab Follow, 48 pages	E
--	VC Summer aerial phot taken 6-30-15, 1 page	E
--	VCS Module Q240, 2 pages	E
--	VCS Module Q233, 3 pages	E
--	VCS Module CA36, 2 pages	E
--	VCS Modules, 7 pages	E
--	VCS - Ctmt Elev 084, 116 pages	E
--	VCS - Ctmt Elev 084 (WBS), 12 pages	E
--	VCS Level 2 - Construction Schedule, 23 pages	E
--	VCS Schedule - Module Assembly Detail, 199 pages	E
--	VCS Schedule - Module Assembly, 8/30/15,163 pages	E
--	VCS Schedule - Testing & Startup Detail, 1289 pages	E
--	VCS Schedule - Testing & Startup Summary, 8/30/15, 8 pages	E
--	VCS Schedule - Construction Site Prep Summary, 3 pages	E
--	VCS Schedule - Construction Site Prep Detail, 233	E
--	VCS Schedule - Testing & Startup, 8/30/15,12 pages	E
--	VCS Schedule - Construction Site Prep, 276 pages	E
--	EDCR-Bechtel Request 10-1-15, 10 pages	E
--	EDCR-Bechtel Request 10-1-15, 7 pages	E
--	VC Summer Plan of the Day 10-7-15, 32 pages	E
--	CBI EDCR Report 10/2/2015, 14 pages	E

Table A-1. Documents Reviewed During the Assessment		
No.	**Description**	**Hard Copy (HC) or Electronic (E)**
--	CBI EDCR Report 10/2/2015, 15 pages	E
--	2015 09 30 - Bechtel Assessment - Document Request - Tracking Document, 9/30/15,19 pages	E
--	2015 10 02 Rev1 - Bechtel Assessment - Document Request - Tracking Document, 10/2/15,20 pages	E
--	2015 10 08 - Bechtel Assessment - Document Request - Tracking Document, 10/9/15,37 pages	E
--	VC Summer Plan of the Day, September 29, 2015, 40 pages, PowerPoint 8.5 X 11	HC
--	Civil Generic Guidance Open Items, 12 pages, 11X17	E
--	Straightening Studs, email, 10-13-15, 5 pages, 8.5 X 11	E
--	Non-manual Turnover Rate, email, 10-12-15, 3 pages, 8.5 X 11	E
--	Email Drawings required for Electrical cable tray support, Kelly to Matthews, 9-24-15	E
--	Annex Building Cable Tray Support Area 1, EL. 100'-0" APP-4031-SH-E002, Dwg No APP-4031-WF-E002	HC
--	Annex Building Cable Tray Support Area 1, EL. 100'-0" APP-4031-SH-E002, Dwg No APP-4031-VF-E900	HC
--	Annex Building Cable Tray Support Location Plan Area 1 & Area 4 EL 100'-0" Sheet 3 0f 3, Dwg No APP-4031-SH-014	HC
--	Fabrication Requirements Cope Tray Supports Seismic Category III Trapeze Rod Support Detail, Dwg No APP-SH27-VF-201	HC
--	Annex Building – Area 1 Supplemental Steel Plan @ EL 117-6", Dwg No APP-4041-SA-002	HC
--	Annex Building Cable Tray Support List & Fabrication Details, Area 1 & Area 4, EL 100'-0" SH 3 of 3, Dwg No APP-4031-SHX-01401	HC
--	Annex Building Cable Tray Support List & Fabrication Details Area 1, EL 100'-0" SH 1 of 3, Dwg No APP-4031-SHX-01201	HC
--	Annex Building Cable Tray Support List & Fabrication Details Area 1, EL. 100'-0" SH 2 of 3, Dwg No APP-4031-SHX-01301	HC
--	Annex Building – Area 1 Supplemental Steel Plan @ EL. 117'-6", Dwg No APP-4041-SA-001, 1 page,	HC
--	Annex Building – Area 4 Structural Steel Roof Framing Plan Elevation 117'-1 ½" (LP), Dwg No APP-4044-SS-001, Dwg No APP-4044-SS-001	HC
--	Annex Building – Area 1 Steel Framing Plan @ EL. 117'-6", Dwg No APP-4041-SS-001, 1 page, 11X17	HC
--	CBI Daily Force Report, 10/12/2015, 1 page, 8.5 X 11	E
--	CBI Daily Report, 10/12/2015, 3 pages, 8.5 X 11	E
--	VC Summer Plan of the Day, October 13, 2015, 33 pages, 8.5 X 11	E
--	Document Complexity N-Type EDCRs 10-15-15, 2 pages, 8.5X11	E

Appendix B

Assessment Team Resumes

INFRASTRUCTURE
MINING & METALS
NUCLEAR, SECURITY & ENVIRONMENTAL
OIL, GAS & CHEMICALS

Richard L. Miller

Manager of Operations

Assessment Team Leader

Technical Qualifications

- Senior Reactor Operator's License No. 20411

Education

- Executive Management Certificate, Vanderbilt University
- B.S., Mechanical Engineering, North Carolina State University

Memberships

- Member, American Nuclear Society Board, Operations and Power Division
- Member, American Nuclear Society

Dick Miller is a degreed mechanical engineer with over 38 years of nuclear engineering, construction, and project management experience. Currently he is the Operations Manager for Nuclear Power, responsible for the successful execution of Bechtel's nuclear power projects worldwide, as well as leading a senior executive team performing an assessment of the status of the V.C. Summer Units 2 & 3 new builds. He has unparalleled experience as a project manager, overseeing numerous highly successful Steam Generator and Reactor Pressure Vessel Replacement (SGR/RPVHR) projects, including the world record for shortest duration at Comanche Peak Unit 1 and the Ginna SGR, which was the first to use the "through-the-dome" methodology. He is an enthusiastic, committed leader who focuses on providing executive oversight, technical guidance for the successful planning and implementation of projects, and close collaboration between clients and Bechtel to ensure project success. Prior to joining Bechtel, Dick worked for a southeast electric utility at one of the company's nuclear power plants, holding a senior reactor operator's license and managing the utility's maintenance department. Since joining Bechtel, Dick has spent the majority of his career on field assignments across the United States, managing or directing over 20 major modification projects at nuclear power facilities.

Manager of Operations, Nuclear Power

2014–Present: Mr. Miller is responsible for all nuclear projects and services worldwide, as well as the development of new opportunities both domestic and foreign, including the completion of Watts Bar Unit 2 and the Davis-Besse SGR and Wolf Creek Pipe Replacement projects, as well as the commencement of the Beaver Valley Unit 2 SGR. Currently, he is leading a senior executive team performing an assessment study of the status, challenges, and opportunities of the new build AP1000 units at V.C. Summer for the owner.

Senior Project Director, Nuclear Power, Bechtel Power Corporation

2011–2014: Mr. Miller was responsible for the successful implementation of nuclear power projects, including the NextEra EPUs, as well as proposal development and client communications. He also managed Bechtel's efforts related to the Fukushima incident, including staffing and sponsorship of Bechtel employees on the Fukushima Industry Support Team in Tokyo and representation of Bechtel in Tokyo during business development efforts. In addition, he oversaw the Crystal River Unit 3 Containment Repair Project, including management of the Phase 1 engineering and development effort and EPC contract negotiations.

Senior Project Director/Project Manager, SONGS SGR, Bechtel Power Corp.

2010–2011: Mr. Miller was responsible for the successful completion of the SONGS Unit 3 lump-sum SGR, which was completed within budget and ahead of schedule.

Senior Project Director, Nuclear Power, Bechtel Power Corp.

2007–2010: Mr. Miller was responsible for proposal development activities and contract negotiations for numerous SGR, RPVHR, and EPU projects. Significantly, he oversaw the negotiation and implementation of the NextEra Fleet EPU Project, a major multi-billion dollar effort to perform EPUs on six units (Point Beach 1 & 2, St. Lucie 1 & 2, and Turkey Point 3 & 4). This project earned the Business Development Project of the Year Award for the entire Bechtel Corporation.

Senior Project Manager, Beaver Valley Unit 1 SGR/RPVHR and Comanche Peak Unit 1 SGR, Bechtel Power Corp.

2004–2007: Mr. Miller was responsible for the successful completion of the SGR/RPVHR project for FirstEnergy's Beaver Valley Unit 1. This project was named runner-up for Pennwell's Project of the Year at

the Power Generation Conference. As PM for Comanche Peak Unit 1, he led the team that set the world record for shortest schedule of a SGR, and this project was named runner-up for Bechtel's Project of the Year.

Senior Project Manager, Davis-Besse, North Anna, and Surry RPVHRs, Bechtel Power Corp.

2002–2003: Mr. Miller was responsible for the successful execution of head replacement projects at North Anna Units 1 and 2, Surry Units 1 and 2, and Davis-Besse.

Operations Manager, Nuclear Power, Bechtel Power Corp.

2000–2002: Mr. Miller was responsible for the major modification operations of Bechtel's nuclear power business line, and he oversaw the successful completion of the Kewaunee and South Texas Project Unit 2 SGRs. In addition, during this time he took over as Project Manager to complete the D.C. Cook SGR. He was also responsible for the completion of the commercial closeout of the Arkansas Nuclear One Unit 1 SGR.

Manager of Decommissioning, Bechtel Power Corp.

1998–2000: Mr. Miller was responsible for the decontamination and decommissioning business line activities, including Connecticut Yankee and SONGS 1 Large Component Removal.

Project Manager, Tihange Unit 3 SGR

1997–1998: Mr. Miller was responsible, as a self-employed project management consultant, for the management of the Tihange SGR in Belgium.

Project Manager, LaSalle Modifications, Bechtel Power Corp.

1996–1997: Mr. Miller was responsible for the management and installation of modifications at the LaSalle nuclear plant.

Project Manager, Ginna SGR, Bechtel Power Corp.

1993–1996: Mr. Miller was responsible for the management and implementation of the lump sum EPC contract for Ginna's SGR. Additionally, he served as Proposal Manager for several lump sum SGR and major modification proposals.

Project Manager, North Anna Unit 1 SGR, Bechtel Power Corp.

1990–1993: Mr. Miller was responsible for the management and implementation of the lump sum EPC contract for North Anna 1's SGR.

Deputy Project Manager, Indian Point Unit 3 SGR, Bechtel Power Corp. and Manager, Bechtel-KWU Alliance

1988–1990: Mr. Miller assisted the implementation of the Indian Point 3 SGR, as well as prepared proposals and managed awarded conceptual studies for other SGRs and major modifications. Additionally, he was responsible for the Bechtel-KWU Alliance activities.

Senior Reactor Operator/Maintenance Supervisor/Principal Engineer, H.B. Robinson Nuclear Power Plant

1979–1988: Mr. Miller served as Principal Engineer at H.B. Robinson, during which time a SGR was performed, as well as serving as Outage Manager for refueling outages and Maintenance Supervisor for mechanical maintenance. Additionally, he received his Senior Reactor Operator License and authored the Outage Management Manual, the nuclear industry's first, which received an INPO Good Practice award.

Field Service Engineer, Westinghouse Electric Corp.

1977–1979: Mr. Miller was responsible for the erection and inspection of equipment at numerous nuclear power plants under construction.

U.S. Marine Corps, E-5

1971–1973: Mr. Miller received an honorable discharge in 1973.

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Carl W. Rau

Executive Sponsor

Over his 44 year Bechtel career, Carl has served various business lines and corporate functions in project management and executive leadership roles. He is a true leader with unmatched mega-project construction experience that ranges from nuclear power plants to industrial facilities. He also brings an international perspective from his roles overseeing projects around the globe, as well as a thorough understanding of the commercial aspects of large project development and execution. Additionally, he has a broad knowledge of effective and proven processes and procedures, along with a unique ability to motivate those around him.

Education

- AA, Civil Engineering, Penn State University
- Certificate, Business Management, California Coast University

Manager, Special Projects, Bechtel

2012–2015: Mr. Rau served in an executive position leading specialized projects and studies in support of Bechtel's Nuclear, Security, and Environmental and Infrastructure global business units.

President, Nuclear Power

2008–2012: Mr. Rau led the Nuclear Power business line, managing all of Bechtel's global nuclear power activities, including project development, execution, and services. During his tenure, he oversaw numerous project awards and successful executions which significantly grew the nuclear power portfolio, including extended power uprates on six units, steam generator replacements, Watts Bar Unit 2 completion, engineering services at multiple plants, and permitting, licensing, and design for advanced reactor projects.

Manager of EPC Functions, Bechtel Group

2006–2008: Mr. Rau was responsible for all the functional departments of the Bechtel group of companies, ensuring that all world-wide projects and corporate functions were appropriately staffed and processes / procedures were followed.

Executive Vice President – London Operations for Oil, Gas & Chemicals (OG&C)

2005–2006: In this capacity, Mr. Rau oversaw OG&C's London office and Center of Excellence, which was responsible for executing, deploying personnel, and providing technical support for the OG&C global business unit's operations in Europe, Africa, the Middle East, and Asia.

President, Bechtel Infrastructure Corporation (BINFRA)

2004–2005: As BINFRA President, Mr. Rau was responsible for planning, executing, and managing civil infrastructure projects in North and South America, supporting both public and private sector customers.

Executive Vice President, Bechtel Systems & Infrastructure, Inc. (BSII)

2003–2004: Mr. Rau was responsible for the oversight of Bechtel's U.S. Government business, primarily with the Department of Energy and the Department of Defense, specializing in large, complex projects in the areas of defense, space, energy, national security, and the environment.

Manager of Central Functions, Bechtel Group

2002–2003: Mr. Rau was responsible for all the functional departments of the Bechtel group of companies, ensuring that all world-wide projects and corporate functions were appropriately staffed and processes / procedures were followed.

Frederick Execution Unit Manager, Bechtel Power and BSII

2000–2002: Mr. Rau was responsible for all personnel at the Frederick, Maryland Execution Unit office and Center of Excellence, which was responsible for winning and executing work for both the power and government services business units. In 2000, he was elected Senior Vice President.

Corporate Manager of Construction and President of Bechtel Construction Operations Incorporated (BCOI)

1999–2000: Mr. Rau was responsible for all construction personnel world-wide in the Bechtel group of companies, as well as construction execution through BCOI.

Manager of Operations, Europe, Africa, and Middle East

1998–1999: In this capacity, Mr. Rau ensured the effective execution of all Bechtel projects underway in Europe, Africa, and the Middle East, as well as providing support for Bechtel businesses and business development efforts.

Project Director, Dabhol Power Station Project

1999–1999: During his tenure as Manager of Operations, Mr. Rau served as the Project Director for the Bechtel/GE consortium that performed EPCS services for this 2,240 MW combined cycle power project in India (at the time the largest foreign investment in India).

Project Director, Jamnagar Refinery Project

1997–1998: Mr. Rau led the effort to design, build, and commission this massive refinery complex (the largest in the world), which covers 7,500 acres and consists of manufacturing and allied facilities, utilities, off-sites, port facilities, and housing for 2,500 employees. In 1998, he was elected a Principal Vice President.

Manager of Power Operations, Europe, Africa, and Middle East

1996–1997: Mr. Rau ensured the effective execution of all Bechtel power projects underway in Europe, Africa, and the Middle East, as well as providing support for Bechtel businesses and business development efforts.

Executive Assistant to the President, Bechtel Power

1994–1996: Mr. Rau supported the President of Bechtel Power to ensure the effective execution of projects, handling both technical and commercial issues, as well as business development efforts and customer engagement.

Manager of Power Operations, South Korea

1993–1994: Mr. Rau ensured the effective execution of all Bechtel power projects underway in South Korea, as well as providing support for Bechtel businesses and business development efforts.

Project Manager, Comanche Peak 1 & 2 Completion Project

1989–1993: Mr. Rau began as the Project Completion Manager of Comanche Peak 1 nuclear power station, which Bechtel took over from the previous contractor who had failed to complete the project. He was then seconded to the utility owner's organization and was responsible for planning and executing the Unit 2 completion. He successfully led both units to completion, as well as serving as an expert witness for Unit 2 rate case on behalf of the utility.

Mechanical Discipline Manager/Project Completion Manager, Vogtle Nuclear Generating Station

1985–1989: Mr. Rau was responsible for all mechanical work, including management of contractors. This included responsibility for piping, reactor internals, insulation, turbine erection, and fire protection system installation. He supervised a Georgia Power mechanical discipline organization of 2,000 non-manual employees and functioned as Bechtel's senior construction representative responsible for 100+ construction engineers in all disciplines.

Various Field Roles, Nuclear Power Projects

1971–1985: Mr. Rau served in a variety of nuclear power plant construction field roles for Bechtel, including:

- System Completion Manager/Lead Piping Superintendent/Drywell CRD Area Superintendent/HVAC Coordinator — Hope Creek Generating Station
- Lead Piping Superintendent/Piping Superintendent/Assistant Project Field Engineer/Startup Superintendent/ Lead Piping/Mechanical Engineer/Area III Lead Piping Engineer — Susquehanna Steam Electric Station
- Civil Field Engineer — Calvert Cliffs Nuclear Power Plant

Construction Engineer, U.S. Steel Corporation

1968–1971: Mr. Rau served as the survey crew party chief responsible for all field control and construction surveys, as well as a field engineer responsible for all aspects of construction at the soaking facility.

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Ronald L. Beck

Project Manager
(Engineering and Construction)

Ron Beck has spent his entire career in the nuclear power industry. He has a strong civil engineering background and many years of design engineering and field experience, with a solid foundation in the details of work planning and execution. He was project manager for three steam generator replacement (SGR) projects, assistant project manager for one SGR project, and shift outage manager for two reactor vessel head replacement (RVHR) projects. His background also includes civil design work on Grand Gulf, South Texas Project, and Watts Bar. He is a highly dedicated leader with strong technical skills, effective management capabilities, and the ability to motivate teams to successful outcomes.

Technical Qualifications

- Over 43 years of nuclear experience, including 17 in design engineering and licensing, 18 on SGR and RVHR projects, and 5 in next-generation nuclear (EPR, SMR) project management
- Registered Professional Engineer in Maryland (retired); inactive in Mississippi, South Carolina, Tennessee, Texas, and Virginia
- Member of ASCE, ASME
- Author of several published technical papers (available on request)

Education

- ME, Civil Engineering, Virginia Polytechnic Institute (Structural Engineering Major)
- BS, Civil Engineering, Virginia Polytechnic Institute
- Bechtel Certification, Project Manager Level II

Project Manager, Generation mPower Small Modular Reactor

2011–Present: For the Generation mPower (GmP) small modular reactor (SMR) project, Mr. Beck has been responsible for all aspects of Bechtel's scope and project execution and for interface with Generation mPower LLC and Babcock & Wilcox (B&W), as well as potential customers, Industry Advisory Council members, management committee members, and regulatory agencies. His responsibilities include overall management of 230+ professionals, including engineering, licensing, project cost and schedule, procurement and contract functions.

Project Engineering Manager, Generation mPower Small Modular Reactor

2010: For the GmP project, Mr. Beck managed the Bechtel engineering team and the integration of Bechtel's scope with B&W's Nuclear Island scope.

Project Manager, Various Commercial Nuclear Projects

2010: Mr. Beck participated in a due diligence assessment as project manager, civil/structural reviewer, construction reviewer, and overall report preparer. The report outlined the results of the assessment regarding investing in a specific new generation nuclear technology.

2008–2010: Mr. Beck was the responsible project manager for the Bell Bend US EPR nuclear power plant project. He supported AREVA's preparation of responses to the NRC's requests for additional information in conjunction with the design certification process; managed an optimization study; participated in construction schedule development; worked with customer on updating the site utilities plot plan for its Combined License application; and oversaw the development of budgets, schedules, and reports.

2008: Mr. Beck oversaw the development of the long-range strategic plan for the SONGS SGR project. The work involved developing the pre-outage schedule encompassing Bechtel's work from 2008 through 2010 and the Cycle 15 and Cycle 16 (SGR) outage schedules for Bechtel's work and integrating these schedules into the client's online and outage work schedules.

2007: For the Palo Verde Nuclear Generating Station Unit 1 SGR project, Mr. Beck managed all aspects of removing and relocating the V651 valve in the reactor coolant system ASME Class 1 shutdown cooling line to support long-term plant operability and reliability.

2006–2007: As plan coordinator for the SONGS SGR project, Mr. Beck managed the development and submittal to the client of 50-plus management, engineering, and construction plans and 30-plus specific contract deliverables describing the methods and approaches Bechtel would employ to execute its SGR work scope. He also supported the project manager on project commercial and technical issues.

2005: For the Palo Verde Unit 3 SGR project, Mr. Beck managed the installation of a vortex elimination plate in the reactor coolant system ASME Class 1 shutdown cooling line. The plate was later removed as a result of system testing.

2004–2005: Mr. Beck managed or supported proposals for the Turkey Point Units 3 and 4 and St. Lucie Units 1 and 2 RVHR projects; the Crystal River Unit 3 SGR project; the Bruce A Units 1, 2, 3, and 4 SGR projects; the Diablo Canyon Units 1 and 2 SGR projects; the SONGS Units 3 and 4 SGR projects; the SONGS Units 2 and 3 and Palo Verde Units 1, 2, and 3 RVHR studies; and the Palisades RVHR project.

Shift Outage Manager, Surry Unit 1 Reactor Pressure Vessel Head Replacement (RPVHR)

2003: For the Surry Power Station Units 1 and 2 RPVHR project, Mr. Beck interfaced with client, subcontractor, and Bechtel personnel to develop the schedule; attended client/Bechtel plan-of-the-day meetings; interfaced with client and Bechtel personnel on day-to-day operations, including action item meetings and task reviews; and managed Bechtel's day shift containment work during each unit's replacement outages.

Project Manager, Various Steam Generator and Reactor Pressure Vessel Head Replacements

2002: Mr. Beck managed several SGR project proposals, an RPVHR project study for two nuclear units, and an independent third-party SGR project cost estimate study review for a nuclear utility.

1996–2001: For the South Texas Unit 1 (1996–2000) and Shearon Harris (2000–2001) SGR projects, Mr. Beck had the same duties as for the V.C. Summer SGR project.

1995–1996: Mr. Beck developed generic SGR project core team operations and was a member of the team that developed a Bechtel/Westinghouse teaming agreement for SGR projects. He also developed competitively bid SGR projects and sole-source negotiated SGR awards, including the first South Texas Unit 1 SGR involving the Bechtel/Westinghouse agreement.

1992–1994: For the V.C. Summer SGR project, Mr. Beck directed all aspects of engineering, construction, procurement, quality assurance, fixed price cos, and schedule management and subcontractor interface; coordinated interfaces with the client and interfaced with Bechtel senior management, global and regional industry unit and execution unit management, and home office functional departments. During the SGR outage, Mr. Beck oversaw all aspects of the on-site construction activities and managed the development of the Bechtel portion of the outage schedule.

1991–1992: For the ASCO Units 1 and 2 SGR project, Mr. Beck managed photogrammetry and interference walkdowns, the redesign of the biological shield wall, preparation of the technical specification, and technical evaluation of replacement steam generator fabrication proposals. He also managed SGR studies for St. Lucie Unit 1 and for Mitsubishi Heavy Industries, Ltd. in Japan.

Assistant Project Manager, Palisades Steam Generator Replacement Project

1989–1991: For the Palisades SGR project, Mr. Beck provided management overview of the engineering team and management support to the cost and schedule supervisor for schedule and budget control. He assisted in coordinating Bechtel's client interface on licensing and other high priority issues and coordinated the development of the SGR outage schedule with the SGR project team (management, engineering, construction, procurement, subcontractors, and client). As night shift outage coordinator during the replacement outage, he coordinated Bechtel's night shift construction activities with the client and the client's contractors. During job closeout, he assisted the project manager and field services manager with closeout activities, including engineering as-built package completion, contract compliance closeout, outage work activity completion, and licensing and quality assurance review closeout.

Project Engineering Manager, Watts Bar Unit 1

1987–1989: Mr. Beck was the Project Engineering Manager for the Hanger and Analysis Update Program for Watts Bar Nuclear Station Unit 1. In this capacity, he oversaw all design activities associated with the update of the Watts Bar pipe stress analyses and pipe support designs, using a site walkdown team and design teams located in Oak Ridge, TN; Gaithersburg, MD; Houston, TX and San Francisco, CA.

Project Engineer, South Texas Project Completion

1986–1987: For the South Texas Units 1 and 2 project, Mr. Beck supported the civil/ structural, pipe stress and pipe support, architectural, and plant design layout discipline design activities. He directly interfaced with the client in completing engineering design, licensing, and engineering assurance activities associated with these disciplines. He also assisted in managing the contractual and legal aspects of the project's main cooling reservoir; coordinated interfaces with the project's constructor and client and Bechtel management; and directed the coordination of engineering activities associated with Unit 1 hot functional testing, including development of engineering hot functional test procedures for thermal and vibration monitoring.

Design Engineer/Group Leader/Engineering Supervisor, Grand Gulf Units 1 & 2

1972–1985: Initially, Mr. Beck developed various preliminary design studies subsequently used for input to the PSAR and to project cost and final design studies. He reviewed cooling tower structural design calculations, wrote and administered a subcontract for cooling tower foundation piling installation, and wrote piping technical specifications. Later he supported various site engineering tasks and completion of final ultimate heat sink basin structural designs and assisted in managing group design activities. Subsequently, he led the design activities associated with the reactor containment building (RCB) and site and managed a specialized task force performing dynamic loading analysis of the BWR Mark III RCB. He supervised development of the FSAR sections associated with the RCB and other Seismic Category I site facilities. He participated in regulatory hearings with the NRC and the Advisory Committee on Reactor Safeguards in conjunction with the RCB dynamic analyses and assisting in supervising civil/ structural design activities. Ultimately, he was responsible for all civil/structural engineering design activities associated with Unit 2.

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Jonathon D. Burstein

Project Controls Manager

Education

- M.S., Construction Management, Virginia Tech University
- B.S., Civil Engineering, Virginia Tech University

Jonathon Burstein has over 11 years of cost engineering, planning, and scheduling experience, primarily on nuclear projects throughout the United States. He is well-versed in all aspects of project cost management, including budgeting, monitoring, and controlling cost. He has also developed and maintained project outage construction schedules and monitored critical path. Currently, he is responsible for managing project controls for the Beaver Valley Unit 2 Steam Generator Replacement (SGR) Project and prior to that, he spent 5 years on the Watts Bar 2 Completion Project.

Project Controls Manager, Beaver Valley Unit 2 Steam Generator Replacement Project

2013–Present: Mr. Burstein manages the project controls team to monitor and control cost and schedule for the project, and is part of the project management team to help the Project Manager make informed decisions. Mr. Burstein developed the project controls plan and established tools for successful project execution. He also facilitated cross-training of cost and schedule personnel to further develop their skills. The team is currently managing cost and schedule for the engineering effort, with construction planning and support for Unit 2 outages.

2015: While managing project controls for Beaver Valley, Mr. Burstein also provided planning and cost support to new proposals for nuclear work, steam generator replacement projects, and combined cycle projects. Additionally, he provided planning support to a front-end assessment study for new nuclear construction work.

Construction Cost Supervisor, Watts Bar Unit 2 Completion Project

2012–2013: Mr. Burstein supervised a group of up to 6 employees to manage construction costs. Group responsibilities included: daily craft hours monitoring, weekly QURR reporting and analysis, oversight of quantity reporting database, budget maintenance, trend initiation, and various interfaces with the construction organization. He also continued to perform the financial responsibilities listed below, such as PFSR, CWA's, and project budget monitoring.

Cost Engineer – Financials/Craft, Watts Bar Unit 2 Completion Project

2010–2012: Mr. Burstein monitored the overall financial status of project, generated quarterly contract work authorizations (CWAs) for project funding and quarterly project financial status reports (PFSRs) for management, monitored actual expenditures against the project budget and forecast, and initiated construction trends as identified by cost tools. He generated monthly project reports for functional support to Frederick (project status reports, staffing, and gross margin) and provided other functional support as requested. He also supported craft cost controls as described below.

Cost Engineer – Craft, Watts Bar Unit 2 Completion Project

2008–2010: Mr. Burstein maintained labor cost codes and monitored labor charges in eTrack, maintained budgets and incorporated new work order estimates in ePC Works (a tool for budgeting, monitoring, and controlling all aspects of cost for major Bechtel projects), and performed craft jobhour analysis. In addition, he generated weekly quantity unit rate report (QURR) and other reports as required, created quantity reporting database so that the field engineer could enter weekly quantities, and trained others in use of these systems.

Area Scheduler, Watts Bar Unit 2 Completion Project

2008–2008: Mr. Burstein developed field engineering walkdown schedules and tracking tools and developed and maintained detailed construction schedules. He also acted as interim lead construction scheduler for a period of 2 months

Field Planner, Palo Verde Unit 3 Steam Generator Replacement Project

2007–2007: Mr. Burstein developed and maintained project outage construction schedules as the lead planner on day shift. He prepared daily reports for project status, manpower tracking, jobhour earnings, and critical path analysis and trained new planners on SGR scope, planning, and reporting.

Field Planner, Comanche Peak Steam Generator/Reactor Head Replacement Project

2006–2006: Mr. Burstein developed and maintained project outage construction schedules. Work included coordinating steam generator replacement project work activities, preparing daily reports for project status, manpower tracking, jobhour earnings, and critical path analysis, and he cross-trained with the Cost group on craft staffing, subcontracts, and work breakdown structure (WBS) tracking.

Field Planner, Palo Verde Unit 3 N-1 Outage

2006–2006: Mr. Burstein maintained project outage construction schedules as the backshift planner and assisted in schedule development for the Unit 1 valve modification.

Planner, Comanche Peak Steam Generator/Reactor Head Replacement Project

2006–2006: Mr. Burstein maintained project engineering schedule and developed project pre-outage construction schedule, prepared weekly status reports and monthly engineering progress and performance report (EPPR), assisted various projects with schedule maintenance, and worked part-time with AREVA New-Gen to develop engineering schedules.

Field Planner, Palo Verde Unit 1 Steam Generator Replacement Project

2005–2005: Mr. Burstein participated in vertical slice reviews for schedule development. Maintained project outage construction schedules and monitored critical path.

Planner, Central Planning Group

2005–2005: In this assignment, Mr. Burstein assembled proposal schedules and updated various project schedules as needed.

Intern, Miami International Airport Expansion

2004–2004: Mr. Burstein set up and maintained database for tracking and reporting work orders and created project cost and scheduling reports for project management

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Robert A. Exton

Procurement & Contracts Operations Manager

Technical Qualifications

- Member, Original Lifetime Certified Purchasing Manager, Institute for Supply Management
- Bechtel Certification–Procurement Manager

Education

- B.S., Business Administration with Emphasis in General Management, Humboldt State University
- A.S., Forestry Science, North Dakota State University

Bob Exton, Procurement & Contracts Operations Manager for Nuclear Power, has 37 years of procurement experience working on nuclear, fossil, and telecommunications projects, with over half of that time in the nuclear power generation arena. He has held positions of increasing responsibility in various procurement managerial positions, including material management, purchasing and contracts formation, management, and commercial leadership.

Procurement & Contracts Operations Manager, Nuclear Power

2008–Present: In his current role, Mr. Exton is responsible for managing and monitoring procurement and contracts operations for all commercial nuclear projects. His main focus the past year has been the functional oversight of ongoing nuclear projects and proposal efforts, drawing upon past experience, lessons learned, and the Six Sigma philosophy. Additional focus has been on process improvement and procedures directly associated with commercial nuclear activity.

Program Procurement Manager and Deputy Program Procurement Manager, Cingular Wireless Project and the AWS Project

2002–2008: Mr. Exton was responsible for the procurement operations of these telecommunication projects, focusing on Materials Management. He was also responsible for the integration of the AWS project to the Cingular system and for ongoing procurement operations in support of the nationwide build program. This build program included eight markets with a staff of twenty, including material coordinators and a purchasing group.

Proposal Manager, Power Multi-Project Acquisition Group (MPAG)

2000–2002: Mr. Exton was involved with all proposal efforts for power projects and was the primary representative on project development teams assuring that Procurement supported the development schedule.

MPAG Commercial Lead, Balance of Plant and Electrical

2000–2000: Mr. Exton was responsible for managing and coordinating the buying activities in support of the power projects executed from the Power center of excellence.

Project Procurement Manager, Aleppo, Quezon, and Dabhol Projects/Nuclear Operations

1991–2000: Mr. Exton was responsible for developing, negotiating, and administering purchase orders and subcontracts for three fossil power projects in the Middle East and Asia. On the Aleppo Project, Mr. Exton was responsible for final equipment buyouts, expediting, inspection, traffic and logistics and shipment of remaining equipment and services.

Additionally, was involved in the development of new power plant construction projects.

In his Nuclear Operations role, Mr. Exton was responsible for coordinating procurement activities associated with North Anna Unit 1 SGR, V.C. Summer SGR, and FURNAS project and for the issuance and administration of major lump sum subcontracts.

Senior Contracts/Purchases Supervisor Specialist, Palisades Steam Generator Replacement

1989–1991: Mr. Exton was responsible for negotiating and issuing major lump sum subcontracts and purchase orders.

Contracts/Purchases Supervisor Specialist, Limerick Nuclear Project

1987–1989: Mr. Exton was responsible for coordinating purchasing activities, administering assigned blanket orders, and supervising closeout of home office contracts and field purchase orders.

Contracts/Purchases Supervisor/Specialist Buyer/Spare Parts Supervisor/Warehouse Receiving Supervisor, Palo Verde Nuclear Project

1978–1987: Mr. Exton was responsible for assisting in forecast planning, conducting training on procedures, and reporting progress to the client and engineering.

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Jason S. Moore

Project Controls Manager

Jason Moore has 17 years of project controls experience in the power generation construction industry, with well-rounded expertise in planning, construction, cost, estimating/proposal development, and subcontracts for both nuclear and fossil power plants. For the past 6 years, he has had positions of increasing responsibility on large-scale nuclear power projects, culminating in his current role as Project Controls Manager for Bechtel's on-going engineering services work at Southern Nuclear's three operating nuclear facilities in Georgia and Alabama.

Education

- B.S., Business Management & Finance, Salisbury State University

Project Controls Manager, Southern Nuclear Engineering Services Project

2013–Present: Currently, Mr. Moore is responsible for all cost- and schedule-related functions, initiating and implementing project controls tools and programs, and providing technical direction to project controls personnel on this project that provides engineering services to Southern's three operating nuclear plants (Farley, Hatch, and Vogtle).

Project Controls Manager, Wolf Creek Essential Service Water Buried Pipe Replacement Project

2011–2013: Mr. Moore was responsible for all cost- and schedule-related functions, initiating and implementing project controls tools and programs, and providing technical direction to project controls personnel on this project that replaced over 30,000 lineal feel of underground and underwater piping that was deteriorating at the Wolf Creek Nuclear Plant. He provided day-to-day supervision to project controls personnel and interfaced with all functional groups to ensure compliance with execution strategy and objectives. He also provided status information and related analysis to the project manager, project controls operations manager, and project team, as well as interfacing with customers, contractors, and other outside personnel. Additionally, Mr. Moore led specialized studies and provided other specialized support to project and functional management, as required.

Shift Outage Manager/Assistant Project Controls Manager, Turkey Point 3 & 4 Extended Power Uprate Project

2009–2011: While assigned to the Turkey Point EPU project, Mr. Moore held a number of positions of increasing responsibility including:

- Shift Outage Manager—responsible for managing the "team room" for a 43-day outage with a peak craft headcount of 300, reviewing, modifying and driving the project schedule through the nuclear outage, interfacing daily with the plant management team, removing obstacles, and finding quick solutions to daily challenges and issues.
- Assistant Project Controls Manager—responsible for decisions and financial reviews, developing senior management presentation material on multiple occasions for client reviews, chairing multiple client review sessions ranging from trends to Level 3 vertical reviews, personnel management of project, staffing decisions, and employee development, attaining more balanced perspective between the cost and schedule functions, and actively participating in financial development and reviews.
- Planning and Scheduling Supervisor—responsible for providing direct supervision to eight employees, serving as one of the leads driving the U3R25 outage including analysis-based redirection, major recovery planning, and "team room" staffing, developing unique tools to simplify a complex planning project that is now used at all customer project sites.
- Project Planner—Field and Engineering, responsible for presenting the Project Controls status at the Monthly Progress Report to customer senior management, and scheduling lead for all aspects of

schedule development including engineering, construction, procurement, subcontracts, startup, and customer schedule integration.

- Project Estimator—responsible for developing a plan to provide an estimate to customer for all the EPU projects along with all the templates required to complete the task in a short duration, conducting onsite working sessions/presentations at each of the customer's project sites, in which Level 1.5 schedules with associated resources were developed, with the results serving as the basis for all the EPU estimates. Mr. Moore presented the estimate to Bechtel customer senior management.

Project Planner, Midwest Generation Powerton Environmental Program Project

2008–2009: Mr. Moore's responsibilities included scheduling lead for all aspects of schedule development including engineering, construction, procurement, startup, client, and OEM partner schedule integration on this project to install an air quality control system on a dual unit coal-fired power plant. He worked directly with project management, client management, and OEM management developing all levels of schedule (Level I, II, III, IV), implementing the use of Primavera 6.0 on the project.

Project Planner, Sammis Air Quality Control System Retrofit Project

2008: Mr. Moore provided direction and training to the onsite planning staff on this 2,200 MW coal plant, facilitating communication between the Bechtel and Client organizations through interactive white-boarding schedule development sessions. He led the planning effort of the main transformer installation and its related outage, discovering and fixing issues as they arose. He also developed a new tracking report to be used by Bechtel and Client management that tracked real-time data in association with bulk piping installation.

Project Planner, Sutherland Project

2007–2008: Mr. Moore supported the development of the initial estimate and schedule for this proposed power project, developing a level II schedule and supporting documentation to successfully convey project schedule viability, and presenting the overall plan to the project team and leading discussions on its future development including risks and challenges.

Engineering Planner/Lead Planner, Oak Creek Expansion (Elm Road) Project

2004–2007: As Lead Planner on Elm Road, a 1,300 MW two-unit EPC new build coal-fired power plant, Mr. Moore was responsible for coordinating and issuing the critical action items and chairing the CAI meeting. He provided technical direction to the lead engineering planner and supported field personnel. He also led a number of special studies and 'what if' analyses, as directed by the Project Director. He participated in the rebaselining of the construction schedule, developed multiple detailed schedule tracking tools to better define project goals, provided important analysis regarding the timing of cable deliveries to take advantage of the future reduction in the market price of copper, and developed the first startup level 3 detailed schedule.

As Engineering Planner, Mr. Moore was responsible for maintaining the Level I, Level II, and Level III schedules, creating and maintaining bulk commodity curves for Engineering releases and the project short-term work plan, analyzing entire schedule network to avoid potential issues with project deliveries, leading procurement activities to ensure timely delivery of materials by establishing delivery dates for material requisition, reviewing cost estimates and trends for schedule impacts, and developing and maintaining the Engineering Progress & Performance Report and the Engineering dashboard.

Engineering Planner, Mountain View Combined Cycle Gas Turbine Project

2003–2004: Mr. Moore's responsibilities included developing and maintaining the Level I, Level II, and Level III schedules, bulk commodity curves for engineering releases, and the project short-term work plan. He was also responsible for analyzing the entire schedule network to avoid potential issues with project deliveries, leading procurement activities to ensure timely delivery of materials by establishing delivery dates for material requisition, reviewing cost estimates and trends for schedule impacts, and communicating the overall project schedule to the project and client management.

Proposal Planner, Bechtel Power Project Controls Central Function

2000–2003: Mr. Moore worked with business development managers and construction managers to assist in development of strategic positions of new proposals. He was responsible for developing the milestone summary schedules for management reviews during the proposal phase, developing Level II project schedules, developing and maintaining Level III P3 schedules, developing bulk curves and manpower curves, producing development schedules for pre-NTP phase and proposal phase, and maintaining comparison data for new proposals. Proposals ranged in value from $300 million to $3 Billion.

Indirect Estimator, Bechtel Power Estimating

1998–2000: Mr. Moore was responsible for developing craft wage rates, supporting the development of manual distributable costs, developing home office costs, tracking metrics for proposal costs and services estimates, gathering data for quantity and jobhour comparisons, supporting the preparation of proposal review packages, developing proposal cashflows and proposal profitability summaries, and preparing proposal pricing sheets.

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Robert E. Pedigo

Project Startup Manager

Technical Qualifications

- Registered Professional Engineer, Pennsylvania (Electrical) and Illinois (inactive)
- Six Sigma Black Belt

Education

- B.S., Electrical Engineering, Pennsylvania State University

Bob Pedigo is a seasoned Startup Manager with 39 years of increasing responsibilities both on projects and in functional management. He is a Bechtel Startup Subject Matter Expert, and his expertise includes plant startup and startup planning of systems and facilities, plant maintenance and reliability (nuclear, petrochemical, and industrial), procedure development, and multi-discipline organization coordination. In addition, he is a Six Sigma Black Belt who has successfully developed and implemented several startup process improvements.

Deputy Manager of Startup, Bechtel Oil, Gas & Chemicals (OG&C)

2014–Present: Mr. Pedigo is responsible for startup functional oversight of the OG&C global business unit projects in development and execution around the world.

Chief Startup Engineer, Bechtel OG&C

2013–2014: Mr. Pedigo was responsible for overseeing startup at multiple Liquefied Natural Gas (LNG) projects from the Houston OG&C headquarters.

Chief Startup Engineer, Bechtel Corporation

2011–2013: Mr. Pedigo was responsible for the continued development and revision of Bechtel's corporate Startup Procedures (content and configuration management) and the management of the corporate Startup Engineer Certification program and oversight of corporate startup records and archives. In addition, he served as a Startup Subject Matter Experts for several nuclear power and LNG projects.

Project Startup Manager, mPower Small Modular Reactor (SMR) and Calvert Cliffs Unit 3

2008–2011: On the mPower SMR project, Mr. Pedigo oversaw design input, program development, and early project planning during the development of the SMR design and execution planning. On Calvert Cliffs 3, he performed design input, program development, and early project planning for the US-EPR nuclear power reactor design that was proposed for the Calvert Cliffs site.

Assistant Manager of Startup, Bechtel OG&C

2004–2008: Mr. Pedigo assisted in startup functional oversight of OG&C projects in development and execution.

Six Sigma Black Belt, Bechtel Corporation

2003–2004: As one of the Six Sigma Black Belts, Mr. Pedigo successfully developed, completed, and implemented two Process Improvement Projects (PIPs), that improved Bechtel's process and procedures for Steam Line Cleaning and Chemical Cleaning. He also conducted Six Sigma awareness training and program audits throughout the company.

Project Support Supervisor, Bechtel Corporation

2000–2003: Mr. Pedigo's responsibilities included project development support (proposal estimating, schedule development, and execution philosophy input), project execution support, and startup execution philosophy research and development for projects mainly in the Power and Government Services sectors.

Lead Startup Engineer, River Protection Project

1999–2000: Mr. Pedigo's responsibilities included development of the startup portion of project estimate and schedule, development of commissioning strategy and startup program, development of test section of the

Preliminary Safety Analysis Report, and provision of input to design for startup, maintenance, and operations on this Department of Energy nuclear waste vitrification project in eastern Washington.

Site Manager, BP Amoco and Koch Refinery Projects

1997–1999: Mr. Pedigo had overall responsibilities for capital projects, maintenance support, and turnarounds at BP Amoco's Pasadena, TX plant. For the Koch Refinery, he had responsibility for 300 direct hire craft and 35 non-manual staff, with scopes of work including maintenance, turnarounds, and capital projects under $10 million.

Project Startup Engineer, Koch Refinery and Hoechst Celanese Projects

1994–1997: Mr. Pedigo's responsibilities included Koch/Bechtel Alliance development, Koch Corporate maintenance program reengineering, KRC-CC maintenance program development (east and west plants), plant reliability program development, maintenance technology development, and maintenance resource redeployment. On the Hoechst project, his duties included client maintenance organization restructuring, plant reliability program improvement, process and equipment improvements, and plant preventive / predictive maintenance program development.

Project Engineer, Dresden and Quad Cities Nuclear Power Plant Maintenance & Modification

1991–1994: Mr. Pedigo's responsibilities included oversight of the resident engineering group, client interfaces, building a resident team, and facilitating execution of work, as well as project planning, maintenance group restructuring, and site procurement process evaluations.

Project Startup Engineer, Susquehanna Steam Electric Station

1987–1991: Mr. Pedigo served as site manager for all Bechtel activities at Susquehanna, including interfaces for operating plant services and coordinating support with multiple Bechtel offices. Additionally, he performed in a seconded role to PP&L as a mechanical maintenance planner. His responsibilities included generating work plans for work authorization documents using PP&L mainframe, knowledge of ASME Code (including NIS-2 forms, code repair forms and code retest and inspection requirements), familiarity with plant technical specifications, preparation of weld travelers, jobhour estimating, ALARA radiation blocking, personnel safety blocking, materials and parts, operating plant impacts, special tooling and techniques.

Senior Startup Engineer, Susquehanna Steam Electric Station

1982–1987: Mr. Pedigo was ACR/PGCC group supervisor, responsible for special projects, design change package implementation, Regulatory Guide 1.97 changes, and human factors engineering. Additionally, as supervisor of the procedure-writing group, he was responsible for technical specification compliance review documents and local panel alarm response procedures. Later on in the project, he was responsible for project coordination and startup of an additional standby emergency diesel generator, as well as schedule development, project scoping, design compliance, and operability review.

Startup Engineer, Susquehanna Steam Electric Station

1980–1982: Mr. Pedigo was responsible for the startup worklist (open items tracking), as well as the startup of the standby diesel generator and 24 and 125 V DC systems. He assisted in the Unit 1 integrated leakage rate test and preliminary work for vessel nuclear instrumentation.

Field Engineer, Comanche Peak Nuclear Generating Station

1979–1980: Mr. Pedigo was responsible for generating turnover packages, system scoping, and system walkdowns; generating and verifying construction punchlist completion; conducting weekly construction turnover progress meetings; and presenting system turnover to client.

Field Engineer, Susquehanna Steam Electric Station

1976–1978: Mr. Pedigo was responsible for the electrical and instrumentation portion of the primary containment structural integrity test; civil support in the reactor building and control structure; and raceway and equipment installation for the control structure, containment, and reactor buildings, including the advanced control room/power generation control complex (ACR/PGCC).

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Jerry B. Pettis

Project Administrator

Education

- B.S., Business Administration, Lander University

Military Service

- U.S. Army, 1968-1971
- South Carolina Army National Guard, 1972-1979

Jerry Pettis is a seasoned, results-oriented professional with 26 years of experience within contractor organizations supporting Department of Energy nuclear facilities and the National Nuclear Security Administration. He has proven leadership capabilities in interpreting and executing requirements, reducing costs, maximizing team productivity, and developing innovative tools. He has successfully managed teams responsible for a variety of administrative functions to include prime contract requirements, records administration, document control, publications, training, and related budgetary processes. He has returned to Bechtel employ after several years of retirement.

Document Services Manager, Depleted Uranium Hexafluoride (DUF6) Project, B&W Conversion Services

2011–2013: Mr. Pettis managed the document and records functions for the DUF6 conversion plants in Paducah, Kentucky and Piketon, Ohio, as well as the executive office functions located in Lexington, Kentucky. His responsibilities included managing all project records, document control, and procedures functions. He ensured that Department of Energy (DOE) documents and records were created, maintained, captured, and protected per published requirements.

Manager, TA-21 Project Services and Infrastructure, Los Alamos National Laboratory, Bechtel National

2009–2011: Mr. Pettis managed administrative and facility services for a $212 million American Recovery and Reinvestment Act of 2009 (ARRA) environmental restoration and decontamination and decommissioning project. His responsibilities included ensuring that the stringent reporting requirements required by ARRA were met; managing all project records, document control, and procedures functions; project training development, implementation and tracking; development and implementation of a robust internal and external communications and outreach program; facility utilization and staff assignment activities; project issues tracking and resolution, and project security.

Requirements Manager, Prime Contract Management Office, Lawrence Livermore National Laboratory, Bechtel National

2007–2009: Mr. Pettis managed complex activities for the laboratory's prime contract, which include ensuring that organizational objectives involving the performance evaluation process, program direction, cost allowability, and other aspects of prime contract management are met. He also was the institutional interface between the company and external agencies for the evaluation and interpretation of regulations and directives for applicability to the prime contract, coordinating with National Nuclear Security Agency's Livermore Site Office in making changes to the list of DOE orders, policies, notices, and standards included in Appendix G of the prime contract. Additionally, he ensured that responsible managers assess the cost and schedule impacts of any proposed addition of requirements to the contract and coordinating assessment outcomes with the Livermore Site Office.

Document Control Group Leader, Information Resources Management Division, Los Alamos National Laboratory, Bechtel National

2006–2007: Mr. Pettis managed complex activities for institutional level document control activities by establishing an institutional, customer focused, centralized document control program for the laboratory; integrating numerous disparate document control processes and systems into an integrated program. He established minimum training and performance expectations for laboratory document control staff to ensure consistent document control capability and that the appropriate laboratory documents were retained and up-to-date versions were available to all users in a timely fashion. He also supported the Information Resources Management Division Leader in developing and monitoring the division budget.

Manager, Information Resources Department, Nevada Test Site, Bechtel National

2004–2006: Mr. Pettis managed complex institutional level activities for a variety of administrative and technical support services for Bechtel's work on the Nevada Test Site. His responsibilities included functional management of all Bechtel administrative employees and technical writers; operation of the Nuclear Testing Archive; program management for all institutional records and document control; institutional scientific and technical information programs; office services functions such as printing and reproduction services, mail services, printing services through the Government Printing Office (GPO), and convenience copier program management.

Manager, Program Administration and Support Department, Soil & Groundwater Closure Projects, Savannah River Site, Bechtel National

2002–2004: Mr. Pettis managed extensive department level activities in support of environmental restoration activities at the 310 square mile Savannah River Site. His responsibilities included development and implementation operations and regulatory training for environmental restoration employees; development, revision, publication and maintenance of procedures; production of a large number of regulatory documents; development of graphics and presentations to support internal and external communication of the environmental restoration mission, challenges, and successes; document control and records management to include management of the sites Administrative Record and public reading room materials; maintenance of the reproduction center and capability; coordination and management of division clerical and secretarial support personnel; and accountability and inventory of all division property and facilities.

Division Training, Procedures, and Reporting Manager, Soil & Groundwater Closure Projects, Savannah River Site, Bechtel National

1995–2002: Mr. Pettis managed division level activities that included the analysis, design, implementation, evaluation, and maintenance of initial and continuing training for job-specific operator, staff, supervisor and manager training programs. These programs included general, task specific, and regulatory training for 400+ employees and subcontractors; the development, scheduling, publication, and technical support for presentations and reporting to audiences including Department of Energy, Environmental Protection Agency, South Carolina Department of Health & Environmental Control, and the site's Citizen's Advisory Board. He also oversaw the management and maintenance of the division's emergency action and emergency response programs.

Administrative Manager, 400-D Power House, Savannah River Site

1993–1995: Mr. Pettis managed all phases of administrative support for the site's 70 MW coal fired power and steam plant, including the interpretation and administration of Power Operations Department plans and policies; document control and records management; procedures development, and publication and maintenance. He was also responsible for the analysis, design, implementation, evaluation, and maintenance of initial and continuing training for job-specific operator, staff, supervisor and manager training programs for 300+ employees, as well as facility issues investigation as Critique Director. He also functioned as interface with the DOE facility representative for resolving identified facility and programmatic issues and served as area emergency coordinator.

1987–1993: Prior to his position as Administrative Manager, Mr. Pettis held several positions of increasing complexity and responsibility at Savannah River, including the development of a cross functional team to identify, categorize, inspect and maintain the site's earthen dams. He was awarded the prestigious George Westinghouse Signature Award of Excellence for successfully supervising the $10 million, 19 month, PAR Pond earthen dam emergency stabilization project.

Various positions in manufacturing, civil service, finance, management consulting, and banking

1967–1987

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Michael K. Robinson

Construction Manager

Mike Robinson has more than 44 years of project and corporate management, construction, and engineering experience on various fossil and nuclear power generation projects worldwide, as well as U.S. Government environmental remediation and infrastructure rebuilding efforts. He has provided leadership on some of the largest mega-projects in the power and government sectors. His career has spanned all aspects of project and construction management of solid fuel, natural gas, and nuclear facilities, as well as commercial and engineering roles of increasing responsibility. He is a proven and highly respected leader who is equally adept in managerial, technical, and commercial roles. He has recently returned to Bechtel after several years in retirement.

Technical Qualifications

- Registered Professional Engineer in Pennsylvania

Education

- B.S., Civil Engineering, University of California
- Certificate, Bechtel Executive Plan XVIII

Project Manager/Site Manager, Crystal River Unit 3 Containment Repair Project

2012–2013: Mr. Robinson led the multi-disciplinary team to develop engineering/construction solutions and cost and schedule estimates for the Crystal River 3 containment delamination repairs, one of the most technically daunting efforts in the industry, from its initial development through the phase I engineering effort until the project was cancelled by the customer and the plant permanently shut.

Project Manager, M-3 Mixing Project

2010–2011: Mr. Robinson was responsible for managing the closure of the mixing issues for the waste receiving, transfer, and mixing tanks and issues associated with them for this Department of Energy (DOE) site. Project requirements were to design the systems and provide testing that demonstrates the design works. DOE HQ and local office personnel required that any issues surrounding the Mixing Project were identified to ensure that the plant will operate for its 40-year life.

Area Project Manager/Project Operations Manager, Waste Treatment Plant (WTP)

2007–2010: Mr. Robinson was the Area Project Manager for the Plant-wide account that includes Engineering, Construction, Acquisition Services, Materials Management, and Startup for this $15B+ project. He had the responsibility to ensure that each department is meeting their budgets and schedules, have proper staff to meet the project needs, and have proper plans to go forward. Each department had to identify any cost or schedule changes and have adequate documentation and justification for those changes. Mr. Robinson interfaced daily with his client counterpart to ensure they were aware of current issues and events. In addition, he was the Project Operations Manager, and these additional responsibilities included safeguards and security, risk management, project support, and special project management projects. Mike was also the Six Sigma deployment manager.

Site Manager, Oak Creek Expansion Project (Elm Road)

2004–2007: In this capacity, Mr. Robinson was involved in developing the construction philosophy for this 1,300 MW two-unit EPC new build coal-fired power plant, including detailed up-front planning for execution of the project, staffing, schedule, erection scheme, and interface with engineering, vendors, subcontractors, and unions. The execution of the work included day-to-day direction of all construction personnel, interface with the owner and other agencies to resolve open issues, answer questions, and coordinate plans because of the existing power plant on the same site.

Operations Manager, Iraq Project

2003–2004: Mr. Robinson was responsible for all work in the northern two thirds of Iraq, which included included power projects, water and waste projects, bridge repair, telephone infrastructure repair, and school and hospital repair. Daily interface with both USAID and the U.S. military as required to coordinate work and ensure the most pressing projects were worked and funds were available. Additional coordination with the